Railway Age

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EDITORIAL

Railway Age

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A Competition on Co-operation

THE WORD "CO-OPERATION" has been so carelessly used that for a while it seemed almost to have lost its force so far as its constructive application to the relations between the men and the managements in the railroad field was concerned. It is interesting to note, however, that within the past year or two it is beginning to have a more vital and forceful meaning. The big problem today in bringing about a larger degree of co-operation seems to depend upon a better understanding of the fundamental principles which underlie the successful co-operation between men and managements and a knowledge of how to go at the problem and build substantial foundations for a successful program. Probably no one problem in the railroad field has ever received so much thought and consideration as has this one.

Results are beginning to show themselves in various places and under widely varying conditions, but there still seems to be a lack of understanding as to just how to tackle the problem in the biggest and best way. For this reason the *Railway Age* invites contributions on "Best Methods for Bringing About Co-operation Between Railways and Their Employees to Promote Efficiency." A prize of $100 will be given for the best paper and one of $75 for the next best, received on or before April 15, 1924. Articles not awarded a prize, but which are accepted for publication, will be paid for according to our usual rates. The judges will be requested to base their decision upon the practicability of the suggestions which are offered. Contributions should be addressed to the Editor of the *Railway Age*, 30 Church street, New York.

It's Not Too Early to Prepare

With the number of cars which are being loaded exceeding 900,000 weekly, thus establishing a new high record for this season of the year, it is evident that the roads are facing a traffic this spring which will exceed that of last year. It is also evident that the "million car a week" line will be crossed earlier in the year than ever before. The roads surprised themselves and the public at large with the facility with which they handled the tremendously heavy traffic last year, meeting all demands for transportation and rendering a service which has never before been equalled in this country. This has brought them the good will of the public to an extent that they have not possessed for a long time. With the volume of traffic now being handled, and the indications are that it will grow rapidly as outside construction work opens, it is evident that the capacity of the roads will again be taxed and probably more severely than last year. This makes it necessary for them again to bring into play those measures which proved so effective in avoiding congestion and delay last year. No small part of the results last year were due to the fact that the entire organization was keyed up to the necessity of keeping *all* traffic moving *all* the time, thereby avoiding accumulation and congestion at local points which, once out of hand, have been found to spread rapidly. It is not too early to begin to plan those measures which should be made effective in order that the organization may be prepared for the traffic *before* it arrives. Some additions to facilities have been made available since the peak business of last fall, but in the main the plant is the same as that which handled last year's traffic. System and division operating officers can well afford to study their facilities with the greatest care in the light of last year's traffic and to apply the lessons then learned to the handling of the traffic this year in a way which will add still more to the capacity of the roads and thus serve the business interests of the nation more efficiently.

Car Loadings in Canada

Weekly car loading figures for the Dominion of Canada are now being compiled and made public regularly by the Transportation Branch of the Dominion Bureau of Statistics at Ottawa and the *Railway Age* has made arrangements to secure these statistics and to publish a summary of them each week. This summary appeared in our columns for the first time in last week's issue, in conjunction with the report on car loadings for the same week in the United States, which is compiled by the Car Service Division of the American Railway Association. The summary of Canadian loadings will appear hereafter in this same position, thus enabling the reader to follow conveniently the trends in both countries. Numerically the Canadian loadings do not bulk very large—for the week ended February 9 they totaled only 51,606 cars—but their fluctuations serve none the less to indicate the trend of business conditions in Canada. Moreover, the railways of Canada and the United States are so closely linked that the figure has a definite importance for American railroad men, particularly those whose lines enter Canada or connect with Canadian roads. We feel, therefore, that our readers, American as well as Canadian, will welcome the regular appearance of this summary in connection with the car loading report for the United States.

Improved Lay-Out of Terminal Facilities

Unquestionably one of the first and most important places to look for an opportunity to improve the average existing engine terminal is in the track layout and the relative positions of the various facilities required for conditioning and turning locomotives. While the entire redesign and relocation of tracks, coal dock, ash pits, inspection pit, etc., would constitute such an extensive improvement program as to require the expenditure of a considerable amount of money, many locomotive terminals are in fairly good shape as regards most of these facilities and deficient in perhaps only one or two. In these cases the deficiency can frequently be overcome at an insignificant expense, compared with the

resulting improvement in the operating capacity of the terminal. It may be that locomotives are being inspected in the enginehouse and the provision of inspection pits, covered or not as may be required, near the inbound tracks will enable advance reports on the condition of locomotives to be transmitted to the enginehouse forces. A pneumatic tube system for the transmission of these reports may be warranted, and in any case sufficient track storage should be added ahead of the inspection pits to prevent choking the main lead. Ash pits can sometimes be relocated to equalize the distance between the inspection pit, coal dock and ash pit and thus prevent "bottling up" locomotives after one operation is completed. The addition of cross-overs will also frequently give added flexibility. Modern thought on terminal design calls for the location of the dispatcher's office, the engineer's room, the general foreman's office and the supply house at or near the inspection pit, thus concentrating the supervision and equipment supply near the point where crews leave and take locomotives. Conditioning operations can be supervised from the foreman's office, either in or near the engine house. A terminal may also be handicapped by a lack of facilities for handling ashes; this situation can be relieved by the addition of a cinder track and gantry crane. Another point which should not be overlooked is the possibility of making minor repairs to quick-turn locomotives without sending them over the turntable which is usually "the little neck of the bottle." In some cases the provision of a small crane-equipped shop in conjunction with the engine terminal may prove advisable for handling heavy running repair work. This is in line with the thought on several railroads to the effect that engine terminals should be equipped to repair locomotives and keep them in serviceable condition until such time as heavy boiler work necessitates sending them to the back shop.

The D. T. & I. in 1923

THE FACT that the Detroit, Toledo & Ironton made a favorable showing for 1923 for the first time (with the exception of monthly periods) since the road was acquired by Henry Ford in 1920, has recently attracted some attention in the newspapers. The road's net railway operating income for the year was $1,786,924, as compared with a deficit in 1922, a net of only $43,322 in 1921 and a rather consistent record of deficits under previous managements.

Mr. Ford and his publicity department have been saying very little of late about their railroad operations but some of the newspapers appear to be still influenced by some of the statements made by and for Mr. Ford shortly after he became a railroad president, to the effect that he was going to "show up" the other roads by new methods of operation. Some of the novelties which were talked of, such as the proposals to reduce rates and speed up train operation by the use of lighter locomotives and cars, have failed to materialize and no innovations are needed to explain the remarkable improvement in the earnings of the road for last year. In 1920 the D. T. & I. had a deficit, as did the railroads of the eastern district as a whole. In 1923 it had a net of $1,786,924, which will about pay its fixed charges for the years since Ford bought it; the roads of the eastern district had a net of $425,000,000. During the interval traffic has increased and the cost of railroad operation in general has been somewhat reduced. But the D. T. & I. had a very heavy traffic before Ford bought it and as a large shipper he has been able to give it a large increase of a very remunerative class of traffic, as automobiles and parts take a relatively high rate.

The D. T. & I. in common with the other roads received a general increase in rates in 1920, and although it at one time offered to reduce its rates, which would have redounded mainly to the benefit of the Ford Motor Company as a shipper, it was prevented by the Interstate Commerce Commission from disturbing the general rate structure and it is still receiving the benefit of the increase granted to all roads. However, because of the larger proportion of high rated traffic, it is now receiving a much higher average rate than the eastern roads in general. Its average receipts for hauling a ton of freight one mile have increased from .844 cents in 1920 to 1.219 cents in 1923, an increase of 32 per cent, while for the eastern district the average has increased only from 1.02 cents to 1.144 cents or 8 per cent and for the roads of the United States as a whole the increase has been from 1.052 to 1.115 cents or 6 per cent. The 1920 figures are the average for the year, the rate increase having been made in August. Most any road having control of a similar class of traffic could make a more favorable showing than the average.

The increase in net on the D. T. & I. last year as compared with the year before was attributable in part to an increase in traffic and in part to a reduction in maintenance expenditures, which took only 28.7 per cent of the revenues as compared with 43.7 the year before. The road's maintenance expenditures for 1922 were unusually large. Whether the reduction in maintenance can be continued much longer remains to be seen.

Analysis of Maintenance of Equipment Costs

IN 1923 THE RAILWAYS CHARGED to the maintenance of equipment account the sum of $1,475,000,000. This was the largest charge ever made to this account in any year in railway history with the single exception of 1920. Comparing 1923 with 1922, there was an increase of approximately $215,000,000, or 17.1 per cent, but there was an increase of only 10.9 per cent in total operating expenses; of only 11.6 per cent in expenses for maintenance of way and structures and of only 8.0 per cent in expenses for conducting transportation. There has been a gradual and continuing disproportionate increase in maintenance of equipment expenses over a long period of years, as is shown in the following tabulation of ratios:

RATIO OF MAINTENANCE OF EQUIPMENT EXPENSES

	To total operating revenues	To total operating expenses	To transportation expenses
1911-1914, annual average	16.4	23.4	45.9
1919-1922, annual average	21.8	27.8	56.6
1923-Year	23.2	29.8	62.8

Many explanations have been offered for the gradually increasing maintenance of equipment ratios over an extended period of years. One of the most plausible was that offered by W. G. Edmondson, assistant engineer motive power of the Reading Company, in a communication in the *Railway Age* of January 12, page 177, discussing the article entitled "Equipment Maintenance Out of Proportion" in the issue of December 23, 1923. Mr. Edmondson suggested that the reason might be the increasing complexity of equipment design, which, while reducing the expenses charged to the transportation due to the economies effected in fuel or wages, nevertheless increased the costs of repair and therefore the charges to the maintenance of equipment accounts. Other suggestions offered have been equally pertinent. The ease of financing by means of the equipment trust has been blamed. In this case the point has been made that it has been easy to purchase new equipment but difficult to finance the acquisition of other railway facilities. As a result the money has gone into new locomotives, for example, and there has

been a slighting of enginehouses, shops and repair facilities generally. These are known to be inadequate on many roads and the situation generally is one that, while it has received a great amount of attention, nevertheless has not received as much as its importance merits.

The operating expense accounts are departmentalized. As a result, an observer who does not go deep into the figures with a realization of interdepartmental effects and relationships is in danger of drawing false conclusions because he may not have before him the complete picture. Frequently an improvement in a general situation will produce economies in one department at the expense of another. This is notably the case with the so-called economy-producing devices. These, for instance, may save coal. By making the locomotive a more efficient unit, they permit increased trainload and the result may also be to permit speedier operation, thereby cutting down over-time. As a result there is a marked saving in fuel and wages per 1,000 ton-miles, all of which saving accrues to the operating department in the form of lower transportation expenses and a lower C. T. ratio. The maintenance of the unit is, on the other hand, made more difficult and while there is a saving in transportation, there is an increase in the maintenance costs. This is, in fact, Mr. Edmondson's argument and that of many other mechanical officers and it is most important.

The question is as to whether there is on the railroads of this country today an adequate realization of the situation as here presented. We are not convinced that there is. We are not ready to believe that if there were an entirely adequate realization of it so many railroads would be struggling along with the inferior repair facilities with which they are trying unsuccessfully to maintain what may be the last word in motive power and cars. We say this admitting the relatively greater ease of financing equipment than terminals. We believe that the time has come, however, for a greater attention to the situation as to repair facilities and repair costs. There may be justification for the continual increase in the ratio of maintenance of equipment expenses to total operating revenues, total operating expenses and transportation expenses. How many railroads, however, have been moved to go beyond theoretical explanations alone?

The need of better and more adequate analysis of mechanical department expenses and a more careful study of the actual facts as contrasted with a theoretical hypothesis cannot be emphasized too strongly. The railways in recent years have devoted great attention to analysis of operating department activity. It is not without significance that by far the larger part of the data in the monthly reports to the Interstate Commerce Commission concerns transportation efficiency. The statistics furnished to the Car Service Division are manifestly transportation statistics almost exclusively. Even the statistical units relating to equipment condition are transportation statistics first, and mechanical department statistics second. It may be that we need more mechanical department statistics. The idea is worth considering.

There is no question, however, about the necessity for mechanical department expenses analysis. Such analysis, however, under our present departmental system of accounting, is not, as we see it, a mechanical department matter alone. The analysis must be interdepartmental and carried out, perforce, by one who is in a position to see, understand and secure action in the related departments. The analysis will get nowhere if the analyst is content to see improvement in his department alone. He must be able to know that savings in one department are translated into reduced and not increased expenses in another. He must realize that dollars spent in one department, while they may increase the expenses of that department, may mean the saving of more dollars in other departments; this is a situation that may arise frequently as between the mechanical and transportation departments. It is only through proper analysis of this kind that adequate co-ordination of interdepartmental activity will ever be worked out. It will be only through such analysis that there will be brought home to the railways an adequate realization of their present policy of favoring equipment at the expense of repair facilities. It is one of the steps looking towards both reduced repair costs and more efficient equipment utilization. These are unquestionably two of the most important desiderata in railway operation today.

On another page of this issue, there will be found an article entitled, "The Analysis of Equipment Maintenance Expenses." In it the author, J. L. White, discusses the information that may be secured from the figures shown in the I. C. C. accounting classification. Other articles on the subject of the analysis of mechanical department expenses are in preparation.

Evolution of Electrification

BY WHAT SEEMS to be a slow process of evolution, the advocates of electric traction and the prospective users are beginning to converse in the same language. Thirty years ago electric locomotives were heralded as a new and improved form of motive power which would quickly find wide if not general application on all trunk line railroads. Following this declaration, an argument was started on the relative merits of alternating and direct current for traction purposes. The railroad man, naturally chary of a tool with which he was totally unfamiliar, in many cases drew the conclusion that if the electrical men could not decide what kind of power ought to be used, then it was a good subject to let alone. This argument effectively retarded adoption of electric traction up to as late a date as 1922 and probably is still having some effect.

Some of the enthusiasts, too, have been prone to resort to exaggeration to make electrification appear more attractive and the result, as might be supposed, was a boomerang. Recently, there has been relatively little said about power systems; an indication that both systems have merit and a prospective user must select the one best suited to his needs. The electrical man is now more appreciative of the rapid strides made in recent years in the development of the steam locomotive. It is also becoming generally understood that the greatest advantages of the electric locomotive lie in its ability to sustain a high tractive effort at relatively high speeds and its ability to work more hours out of the 24. These characteristics make it most suitable for conditions of heavy traffic and heavy grades and the advantages gained must be weighed against the increased capital cost that goes with electrification. At a transportation meeting held recently in Philadelphia by the American Institute of Electrical Engineers, railroad men outlined the railroad problem to the electrical men and showed some of the things which must be done to meet requirements and comply with limitations of track, bridges, drawbar strength, etc. The subject was discussed to the mutual satisfaction of nearly everyone concerned.

A further indication of the process of evolution was shown in a paper presented by W. S. Murray, consulting engineer, before a joint meeting of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers held in New York on February 27. While adhering to the use of the term "superpower," he explained it by saying that it did not mean a huge additional power system superimposed on the already existing systems but meant rather an inter-connection of power systems to provide more adequate and reliable power at lower cost. In speaking of railroad motive power he said, "The steam locomotive has its place today and will continue to justify itself." He also said, "Sometimes one gets the impression that we want to

electrify every rail in sight. That would indeed be fatal." These thoughts are not new to Mr. Murray, but he has not often had occasion to express them in this fashion. He also made other statements much less complimentary to steam power, but when the most ardent of electric traction devotees publicly makes such concessions, it is an indication that the time is near at hand when the railroads can present their heavy traffic problems to the electrical men, and feel assured that they can and will produce results to conform accurately to such claims as they have seen fit to make.

In fairness to all concerned it should be said that some of the electric traction exponents, even though enthusiastic, have hewed to the line and presented accurate if somewhat limited information on the subject. Now the great majority are pursuing this policy, the fund of available information is much more nearly complete and because of these facts the railroad man's confidence is on the mend.

Railway Engineers Must Study Concrete

TIMBER, STEEL AND CONCRETE, the three construction materials in most general use today, present interesting contrasts in the problems which their use imposes on the builders; of the three the problems of concrete are by far the most perplexing. Wood, which is prepared by nature, may be judged as to its fitness for use very largely by visual examination. Steel, while made by man, is produced under centralized control with comparatively fixed conditions that minimize the opportunities for unsatisfactory results, and its quality may be readily determined by tests before it is applied to the structure. Concrete, on the other hand, is fabricated almost entirely at the site of its use from materials, which, with one exception, the cement vary not only as to location but even with the daily changes in the weather. Since it must be put into final place as rapidly as it is manufactured the results of the tests of samples made as the work proceeds cannot be known until long after the mass has thoroughly solidified and is a fixed part of the structure.

Protracted investigations of the properties of concrete, which have approached the problem from all angles, have disclosed the fact that a great many influences are brought to bear on the quality of the finished product. This was not fully appreciated during the early days of the present age of concrete, when an awakening of the wonderful possibilities of the art of reinforcing led to its general application to bridges and buildings. The mixing and placing of concrete was seemingly so simple a matter that the structural engineers left that phase of the problem largely to the foreman while devoting their attention primarily to the mastery of the principles of reinforced concrete design. Failures such as occurred from time to time were ascribed primarily to poor cement, sometimes perhaps with justice; but, owing to the fact that cement, like steel, has been subjected to a refinement of manufacturing processes, it can no longer be made the scapegoat, and the cause of poor or unsatisfactory results must be found in some other circumstance attending the work.

It is not necessary to outline the progress which has been made in the development of the principles of making good concrete. It is now generally recognized that the consistent application of the scientific knowledge now at hand is almost certain to produce uniformly good results. There remains, however, the problem of applying these scientifically evolved principles, to the operations performed by the foremen or workmen who cannot be expected to understand fully the basis upon which they are founded. The problem is a difficult one but this does not mean that it cannot be solved. It is being done daily in all lines of American industry where the fixing of conditions leaves only a few variables to the control of the workman.

Admittedly, the difficulties are more serious in concrete work because very few of the conditions can be fixed. Nearly all of them must be determined in each case for each job and from day to day as the work proceeds. Eventually methods will be subjected to a much higher degree of standardization than is now the case but, for the present at least, the principles of good concrete construction must receive the personal attention of the structural engineer. We know now that he must give as freely of his time to the engineer or to the foreman in the field as he did 15 years ago to the work of the designers in the drafting room, if the work done under his direction is to be attended with the best results.

Railway structural engineers are becoming keenly alive to the responsibility which is imposed upon them and many of them are now applying scientific methods to the analysis of aggregates, the design of mixes, the application of the slump test and other measures to insure the best results. Experience is also showing that the seeming refinements involved in this work are well worth the extra effort which they cost.

Twenty-five years' experience with the general use of concrete has demonstrated that it is one of the most valuable and adaptable building materials that we have. Excellent results have been obtained with the cruder and less scientific methods in vogue until the present time, but the full value of this material as to permanence, strength and uniformity of product as well as in the development of maximum strength for a given expenditure for labor and material cannot be obtained unless the most approved methods are put into practice.

What Class of Member Are You?

THE TROUBLES, trials and tribulations that come to those involved in the management of a railroad club are many. The problems that arise in the arranging of a program and in the arousing of a desire on the part of the members to attend the meetings seems at times to be insurmountable. Many tricks and schemes have been devised to accomplish this almost herculean task of arousing member interest. The time-honored stunt of feeding the otherwise delinquent has been tried out again and again. Anything from a ham sandwich and a cup of coffee to an eight-course dinner seems to arouse the latent mind to a thirst after knowledge. Movies and many other forms of entertainment have been tried with varying degrees of success. However, the planning and arranging of the necessary details means plenty of hard work, and, with few exceptions, this work is borne by a comparatively few members of the club.

A correspondent in telling about the local railway club of which he is a member, made the following statement that applies to the members of other railroad clubs: "We have 320 paying members—10 working members; about 100 advising members, and the rest are just members. We have to sell them tickets and feed them at every meeting in order to get out a crowd big enough to listen to a speaker." This is indeed a deplorable situation. However, the club is fortunate in having as many as 10 working members, for 10 good men can often hold an army together and win the victory. One hundred advising members might also be counted an asset, but unfortunately most of the advice has to be placed on the bargain counter as too cheap to be sold elsewhere. The advice that is taken usually means more work for the "tireless ten." This fact our correspondent

evidently had in mind, for he does not include the advisory members among those who actually labor.

But, there is still a third class mentioned; namely, the "just members." It is assumed that in this class are the members who come to a meeting occasionally or do not come at all. They pay their dues so that they can get copies of the proceedings to read at their leisure. They are not in a position, or familiar enough with the work of the club to be free with their advice, so, through indifference or sheer laziness, they take the easiest possible course. However, it has been found from experience that this is the class that contains the latent possibilities. It only requires a little prodding by the "tireless ten" to increase their number to a "tireless twenty" and so on. Men who start out new in an organization and know little or nothing of its past history and petty politics, often make the best workers. It is from this class that the organization should get its new blood to give it new life. Perhaps a little study of our own individual record as club members might not be out of order. In which class do you belong, the 10, the 100 or are you just a member?

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Economics of a Food Supply, by Wilbur Olin Hedrick. Considers transportation of food-stuffs, with sources of supply, marketing, etc. 336 p. Published by D. Appleton & Co., New York. $2.50.

Everyman's Almanac, 1924. *Containing Timely Information About the Railroads and Other Matters of General Interest,* written and compiled by David A. Wallace and Agnes Carroll Hayward. 40 p. Published by the authors, Chicago, Ill.

Southern Railway. Prepared by Munds and Winslow. History, growth, mileage, financial condition and other facts. Map inserted. 24 p. Published by Munds & Winslow, New York and Washington.

Your Railway Rates. "A reference book for every trader," on the British Railways Act of 1921. 46 p. Published by Yorkshire Evening News, Leeds, Eng. Price in England 1 shilling.

Periodical Articles

Johore Straits Causeway Opened, by H. S. Miller. Causeway connecting Singapore with mainland, 3,465 feet long, and 60 feet wide, carrying two railway tracks and a 26-foot roadway. Commerce Reports, February 25, 1924, p. 524.

Our Changing Agriculture, by E. M. East. Freight rates, changing market locations, stimulated tastes, co-operative marketing and other factors influencing agricultural conditions. Scribner's, March, 1924, p. 297-304.

Railroad Necessities and the Transportation Act, by S. Davies Warfield. Proceedings of the Academy of Political Science, January, 1924, p. 215-221.

The Research Program of the National Transportation Institute, by David Friday. Proceedings of the Academy of Political Science, January, 1924, p. 207-214.

Transportation and Fuel, by Henry R. Seager. Proceedings of the Academy of Political Science, January, 1924, p. 137-140.

The Upper Parana Lowland: A Problem in South American Railroad Development, by Preston E. James. The railroad communication existing and that that will be required. Bulletin of the Pan-American Union, March, 1924, p. 265-277.

New Books

Railway Amalgamation in Great Britain, by W. E. Simnett. 276 pages. 5½ in. by 8½ in. Bound in cloth. Published by the Railway Gazette, London. Price, 15 shillings.

The problem of railway consolidation is doubtless one of the most important which the railroads of this country will have to solve in the not-far-distant future. Great Britain, faced after the war with many problems similar to our own, has already undertaken a vast experiment along this line; those who are interested in securing a successful solution in this country can be thankful that the results of several years of operation under the new scheme of things in Britain will be available for students of the problem before general consolidations became imminent here.

Time alone will tell the final story as to the wisdom of consolidation under the plan adopted in Great Britain. So far, it is apparently successful. But statistics alone do not tell the story adequately. A knowledge of the problems for which consolidation was proposed as a solution, the type of consolidation scheme adopted and the means of bringing it about are just as important, and nowhere else than in this book are the complete facts on these matters available. The author was a member of the Amalgamation Tribunal, under the direction of which the consolidations took place and, consequently, knows his subject well.

The book deals briefly with the history of the British railways up to the time of the passage of the Railways Act in 1921, telling of the reasons for consolidation and the original proposals concerning the form they should take. The purpose of consolidation in Great Britain was not essentially different from the advantages claimed for it by its advocates in this country—namely, the securing of adequate returns to all the railways through a uniform rate structure, which with many smaller companies tends to starve some lines while paying high returns to others, and the economies to be effected through reducing personnel and ending the duplication of facilities.

Consolidation in Great Britain was brought about in a remarkably short time—less than a year and a half after the legislation defining the lines it was to take was passed by Parliament. The problem was, of course, vastly more simple than it would be in a country like this, but, even giving due consideration to this fact, upwards of a hundred companies were involved and amalgamation was effected entirely by the exchange of securities of the old companies for those of the new on a basis, generally speaking, of equal degree of security and earning power. All railway business in Britain (excepting municipal and narrow gage lines) is now carried on by four companies, each one operating, with some overlapping, in a territory of its own. These companies operate approximately 20,000 route miles of line and are capitalized at a little more than a million pounds sterling.

The author tells in some detail the work of the Amalgamation Tribunal and discusses briefly consolidation, actual or proposed, in several other countries, including the United States. In his final chapter he admits that amalgamation into four companies may be only a step toward amalgamation into one company, which latter might be acquired by the state. He goes further to say, however, that, even if this does take place, the alternative was outright state ownership with political control by a government bureau. Now, he maintains, if state ownership does come, it will mean only a board of directors appointed by the government, leaving the operating organization practically unchanged.

In a large appendix portions of the Railways Act bearing on consolidation and several individual amalgamation and absorption plans are given verbatim. A concise but well selected bibliography is also provided.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Passenger Brakemen Please Copy

MANHATTAN TRANSFER, N. J.

TO THE EDITOR:

Mr. F. R. Pechin, in your issue of February 9, page 368, has enunciated a thought which appears to be quite new, so far as publication is concerned (though it must have arisen in the minds of innumerable passengers long, long ago). It is—

Vestibule doors and traps should be closed carefully and quietly; not slammed as if with a desire to make all noise possible.

Query: How is it that an obvious noise-nuisance, utterly unnecessary, yet frequently observable everywhere on many of our larger railroads should continue to flourish and for long years should have escaped the critical eyes and ears of the Editor of the *Railway Age?* N. P. R.

Change in Classification of Operating Expenses

DULUTH, Minn.

TO THE EDITOR:—

Your editorial in the issue of February 16, regarding the proposed changes in the Classification of Operating Revenues and Operating Expenses is noted with approval, except that you do not make your objections strong enough. In the consideration of such changes two results should be sought; first, to obtain better statistics, and second, to save money. Under the first, most of the advantages obtained in the way of better statistics could be obtained by merely amending portions of the present classification, without tearing down and re-building the entire structure. In the second case, it is very doubtful if any saving in cost will result. Instead it is probable that the additional details required with respect to the sub-accounts for labor, material and miscellaneous items will add to the cost. Moreover, the cost of re-educating railroad accounting staffs will be quite large.

As stated in your editorial the most serious objection to the entire proposal, is that it will make the comparing of statistics difficult. The statistics we now have are reduced in value because of the impossibility of making comparisons for any long period with exactness. Whenever it is desirable to make comparisons between statistics before and after a change, much extra work is necessary. We who are engaged in valuation work are continually encountering the results of previous changes. They make our work difficult and unsatisfactory. It may be supposed that the next tearing down and re-building craze will be directed toward the classification of investment. This would greatly add to our troubles.

This is not written in an effort to obstruct progress. Changes can be made without completely re-writing the classifications. Presumably the changes proposed are caused largely by the criticisms of employees of the railroads. It is a popular "Indoor sport" to criticise everything adversely, but it is a very difficult matter to produce valuable constructive suggestions.

The representatives of the carriers seem to take it for granted that the changes will be made, whether they object or not, and that the most that can be done is to help make the changes as harmless as possible. Why should we not all unite in saying to the Interstate Commerce Commission "Don't change. Make amendments if need be, but do not tear down and re-build completely, for at least 10 years or more."

The spirit of change, merely for the sake of change is far too common these days. Bulletin No. 104 of the Railway Accounting Officers' Association, shows conclusively, that the railroad accounting officers are by no means in agreement relative to these proposed changes. The majority seem to oppose the proposed revision. It would seem advisable to postpone this revision until greater unanimity has developed, and better reasons appear for making it.

W. H. WOODBURY,
Valuation Engineer, Duluth, Missabe & Northern.

Forecasting the Future of Traffic Volume

WASHINGTON, D. C.

TO THE EDITOR:

To those who are called upon to study trends and development, past, present and future, in the transportation or any other industry, graphical methods, if applied intelligently often lead very quickly to results which may be more accurate in the long run than by the use of complex mathematical formulæ. John Balch Blood, in his analysis of future railroad traffic in the *Railway Age* of February 9, 1924, page 369, uses such a method to excellent advantage and very properly calls attention to "stage fright" among some analysts who have not the courage to accept plain indications for the future. This is timely advice, though every one realizes that the value of graphs, formulæ and any other statistics are dependent upon the good judgment used in applying them.

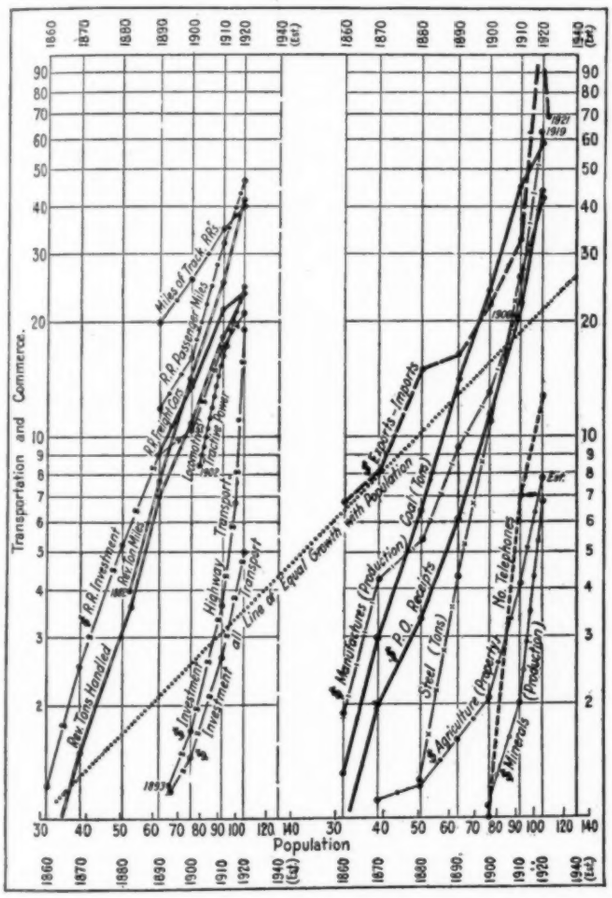
Mr. Blood has used two previous decades to predict a third, *i.e.*, to 1930. And it is interesting that his prediction of 600 billion ton-miles to be carried upon the railroads of this country in 1930 practically coincides with that indicated in a similar study of various factors of transportation and industrial growth presented by the writer before the New York Railroad Club on March 16, 1923, and the American Society of Civil Engineers on September 23, 1923.

Reference to the logarithmic chart accompanying that paper shows these same relations between traffic and population carried back to the beginning of the railway industry about the time of the Civil war.

The transportation trends are compared over the same period with trends of commerce, production, etc. In this study, the years intervening between census periods were not taken into account, because of the uncertainty of the estimates for population and also because the census years just happened to approach normality in the transportation business. The important point is that in reconstructing this past record, one has a background which enhances considerably the value of any statistical analysis for so short a period as two decades, used by Mr. Blood.

It is a remarkable thing that during the whole history

of railroading, revenue tonnage should have increased practically as the 2.7 power of the population and ton-mileage considerably faster than the cube (due, of course, to the increasing length of haul). And one cannot contemplate this record of stable transportation growth without being seized by the conviction that *it must go on* if our country is to progress steadily in its development. Neglecting all the mathematics, this constant upward trend of the logarithmic chart spells but one thing—optimism—and "preparedness," to make this growth possible. Most of the commerce indices follow the same trend—always upward. Only in highways and highway transport investment, is noted a very distinct departure from the straight line trend of the logarithmic chart and this departure sweeps the curve of investment upward at such a rate as to depart from all previous records.



Growth of Transportation and Commerce with Population

But even this remarkable growth curve will ultimately have to find its normal trend.

The growth trends shown in the writer's analysis of the period from the Civil war to 1920 indicate that by 1940 a revenue tonnage of approximately 4 billion tons will have to be provided for and also a ton-mileage slightly under 1,000 billion. This is based upon a population of 130,000,000 people in 1940. These figures may give stage fright; 20 years is not far ahead. But after all the mathematics and assumptions are exhausted this plain record of onward growth of transportation and of commerce—a straight line on a logarithmic chart—stands before us as the greatest defense of optimism. True, water commerce in the 60's and 70's absorbed considerable of the country's tonnage, and no doubt the motor carriers of the future will absorb considerable l.c.l. short haul, but how small a fraction of the total? And water transport will come to the aid of the railroads when needed.

The main point is that if the nation prospers at all, general business is going to double between 8 and 13 years and transportation must move along with it, in some form.

Does not this place before the carriers the immediate necessity of broader planning of future facilities, especially in the terminal gateways where the great majority of the country's traffic concentrates? It would seem that the greatest need of comprehensive planning is in the centers of population where over half of our people reside. Yet how rarely is serious consideration given to an adequate city or district plan, which itself is designed to prepare for that future which is within our grasp. The trend curves clearly point the way, but are our cities and carriers giving sufficient attention to the plain warnings of future congestion? The "battle of the streets" going on in every large city gives some indication of what will come upon us if unprepared.

In a recent comprehensive traffic census in the central district of a large city the writer found commercial vehicle movement approximately *half* of the passenger automobile movement and practically constant throughout the day, yet these passenger streets are of ample width, 90 feet, but cluttered with freight tonnage. In this large city, one railroad actually elevated (by fill) its large team yard area, with freight stations adjacent, within a thousand feet of the city's business and retail center. Another railroad proposed to do the same thing, of course, at enormous expense.

As terminal movements, especially classification and clearing, increase in geometric proportion to the number of contributing line movements, one wonders whether this type of development, following in the beaten tracks will in fact produce the capacity needed for the traffic of the future. In these forecasting studies one may well sound caution but do we not express disbelief in the onward march of our nation if we fail in absorbing the meaning of six decades of practically uninterrupted growth?

J. Rowland Bibbins.

First Three-Cylinder Locomotives in America

New York

To the Editor:

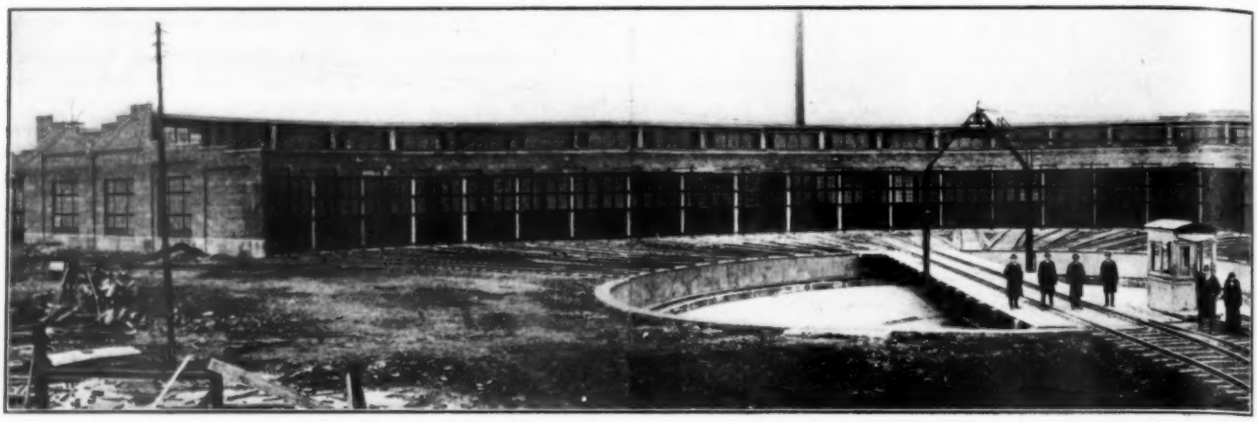
The article on The Year's Tendencies in Equipment Design, appearing in your issue of January 5, 1924, contains the following statement, referring to three-cylinder locomotives:

> The three-cylinder simple locomotive, first tried in America 14 years ago, in fast passenger service and later abandoned, has been reintroduced for high capacity freight service.

The reference is obviously to the locomotives of the Philadelphia & Reading, as indicated by the succeeding statement, on the same page, that that road converted several two-cylinder Atlantic and 10-wheel engines into the three-cylinder type "about 14 years ago."

This statement is in error and should be amended by substituting 75 years ago for 14 years ago. In 1847 or 1848, two Norris locomotives of the Philadelphia, Wilmington & Baltimore, the "George Washington" and the "Ohio," were rebuilt by the company with three cylinders, and their performance was characterized as "highly satisfactory" (see Annual Reports 1847, p. 12; 1848, p. 10; and 1849, p. 22). Such particulars of them as were obtainable will be found in an individual paper by the writer on Three-Cylinder Locomotives, presented at the 1913 convention of the American Railway Master Mechanics' Association, and appearing in the Proceedings of that year, pages 247 and 287.

J. Snowden Bell.



The Enginehouse is Served by a Twin-Span Turntable

Advanced Design in New Engine Terminal

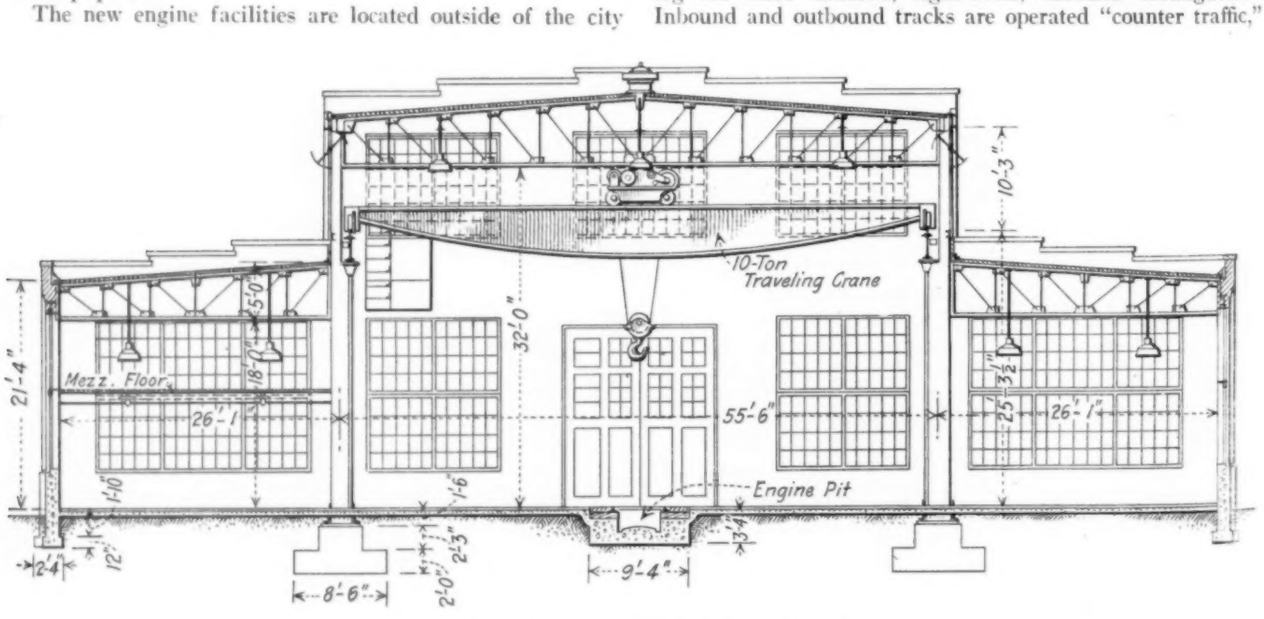
Excellent Structures and Completeness of Equipment Features of Richmond Plant of the R. F. & P.

THE RICHMOND, FREDERICKSBURG & POTOMAC has recently completed an engine terminal at Richmond, Va., which is notable for its capacity to meet effectively and economically the requirements of future increases in traffic, for the permanence of its construction and for the character and extent of the facilities with which it is equipped. With all of its buildings of concrete and brick construction, it is practically fireproof in every way. The installation includes a full complement of well-laid out inspection and ash pits, coaling facilities, a 25,000-ton coal storage, a twin-span turntable, cranes, hoists and electrical driven tools to insure quick and economical turning and repair of locomotives. The facilities for the welfare of the employees, both terminal and road, are exceptionally complete and comfortable. It replaces the old Boulton terminal located within the city limits and now obsolete both in size and equipment.

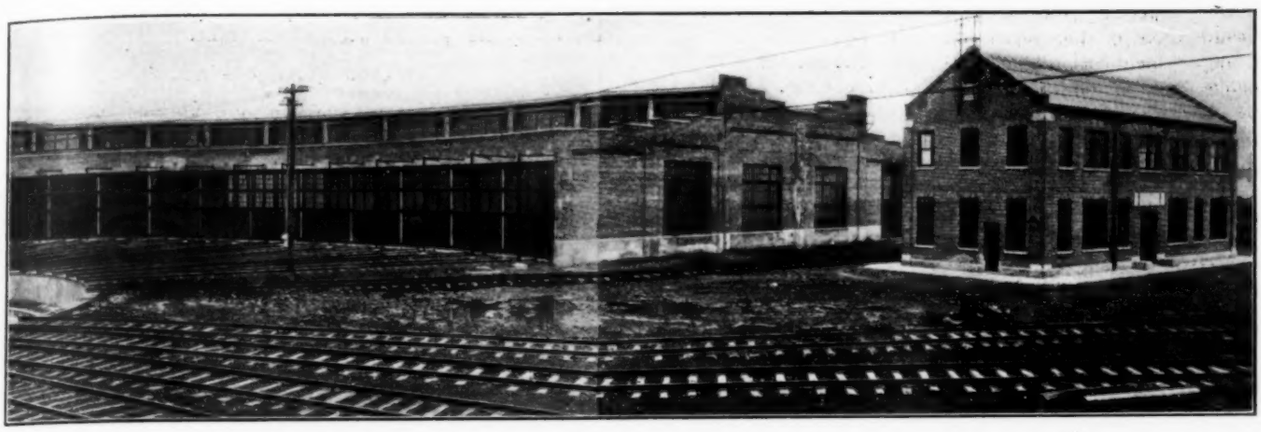
The new engine facilities are located outside of the city limits of Richmond on a tract of land totaling 160 acres and adjoining the Acca freight yard. This yard is the freight interchange point between the R. F. & P. and the Atlantic Coast Line and the engine terminal cares for the Atlantic Coast Line power as well as that of the R. F. & P. This includes both freight and passenger locomotives, the latter operating into the Broad street station, about one mile from Acca tower.

Outside Facilities

The general lay of the terminal tract is north and south paralleling the yard with the logical arrangement for the engine terminal at the south end. Thus any future expansion, of which a large amount is in prospect, must of necessity be to the north. This necessitated a track layout which would take care of this contingency and was carried out by reversing the more common, right-hand, inbound arrangement. Inbound and outbound tracks are operated "counter traffic,"



A Cross-Section of the Machine Shop



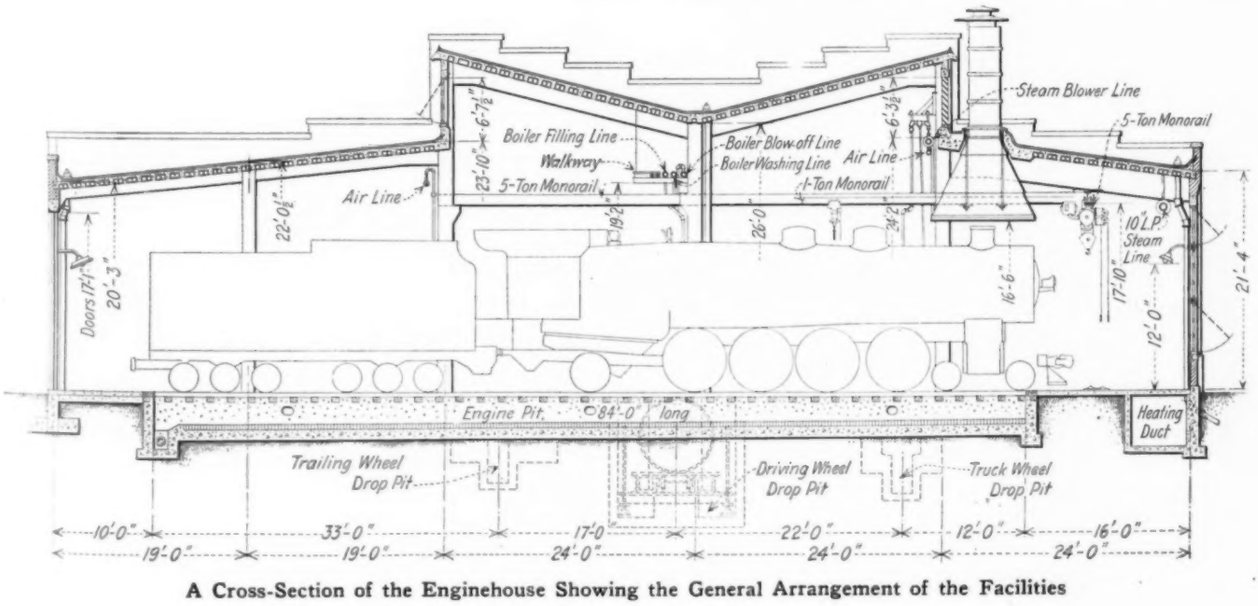
The General ***Appearance*** *of the Structures Indicates the Permanence of Their Design*

i.e., the left-hand tracks facing the engine terminal are inbound and the right outbound. These leads are kept well separated where they approach the main and lead tracks at Acca tower and several cross-overs have been installed in order to prevent any possible blocking of the terminal by derailments or other accidents. An additional outlet is being provided over a lead skirting the freight yard and making connection at its north end. A second track on this lead will care for the wreck train equipment. This arrangement obviates practically all possibilities of bottling up the terminal. The inbound lead serves four inbound tracks, two of which pass over the inspection pits and the regular ash pits. One track forms a direct lead to the enginehouse and the fourth, actually the third on the layout, is for the use of switching engines and the loading out of dumped ashes and ends with the ash pits. The other tracks pass under a 1,000-ton Roberts & Schaeffer concrete coaling plant and thence to a Bethlehem 105-ft., twin-span turntable. The outbound tracks have two grouped and one separate lead from the turntable, the two track portion branching into a number of engine storage tracks now approaching completion. The main stem of the outbound tracks passes along the coaling plant and outside of the ash pit crane runway over a small outbound ash pit of unique design.

The inspection pits are of concrete construction, 100 ft. long, 3 ft. 6 in. deep and given a slight slope for drainage. Located centrally is a concrete lined tunnel which connects both pits and the inspector's office, being reached by a stairway from each pit and a stairway located inside the office building. Excellent lighting has been obtained by rows of six 150-watt angle reflectors on each side, set 7 ft. from the center of the track and 9 ft. 6 in. above the base of rail, *i.e.*, the proper height to distribute the light below the running boards of the locomotives. Pit lighting has been obtained by gas-proof fixtures set in recesses in each pit sidewall and painting these recesses white to secure the maximum reflection.

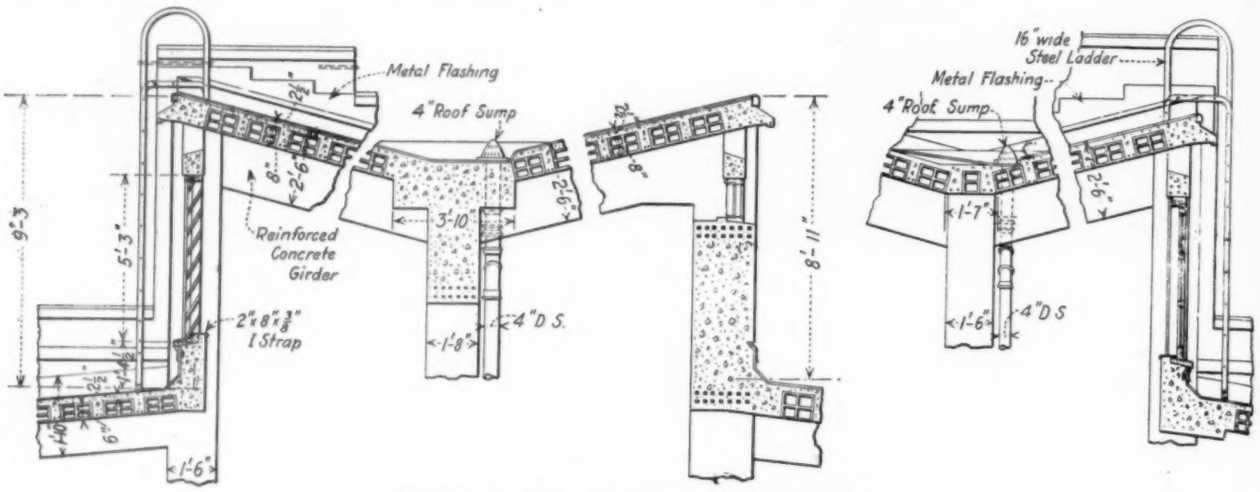
On the north side of the tracks, parallel to the inspection pits, is a brick tool and inspector's house 82 ft. long by 16 ft. 9 in. wide. At the incoming end of the building is a locomotive tool store room 40 ft. long, in which are stored the shovels, oil cans and enginemen's tool boxes removed from the locomotives as they arrive at the pit. Adjoining the store room is a room 22 ft. long, now devoted to electric headlight equipment inspection and repairs. Eventually this room will also be used for such facilities as may be required for the inspection and testing of automatic train control engine equipment. The inspection pit tracks will be sectionalized to permit complete testing of the apparatus while the locomotive is over the pit.

In the west end of the building is the locomotive inspector's office, 20 ft. long. Here the enginemen make out their work reports on the first sheet of a double sheet form, turning it in



A Cross-Section of the Enginehouse Showing the General Arrangement of the Facilities

to the inspector, who enters his inspection report on the second sheet of the form and then despatches the form, through a pneumatic tube carrier system, to the assistant foreman's office in the roundhouse machine shop. While the locomotive is passing over the ash pit and being coaled, the foreman has time to assign it to the most convenient stall for



Some Typical Details of the Roof Construction

the work required and to have preparations made for the work, if the available terminal time is short, before the locomotive arrives at the turntable.

The two main ash pits are 250 ft. long, 3 ft. 11 in. wide and 4 ft. deep, lined with vitrified paving brick and are of the wet ash type. These pits are served by a 5-ton overhead crane and a 2-yd. grab bucket, the runway for which is 375 ft. long with a 50 ft. span supported by steel columns. The central track previously mentioned contains also a short ash pit 100 ft. in length which is used primarily for cleaning the fires of switching engines working in the Acca yard. This obviates any possibility of disturbing the regular operation of the terminal and greatly facilitates the serving of the local switching power between tricks.

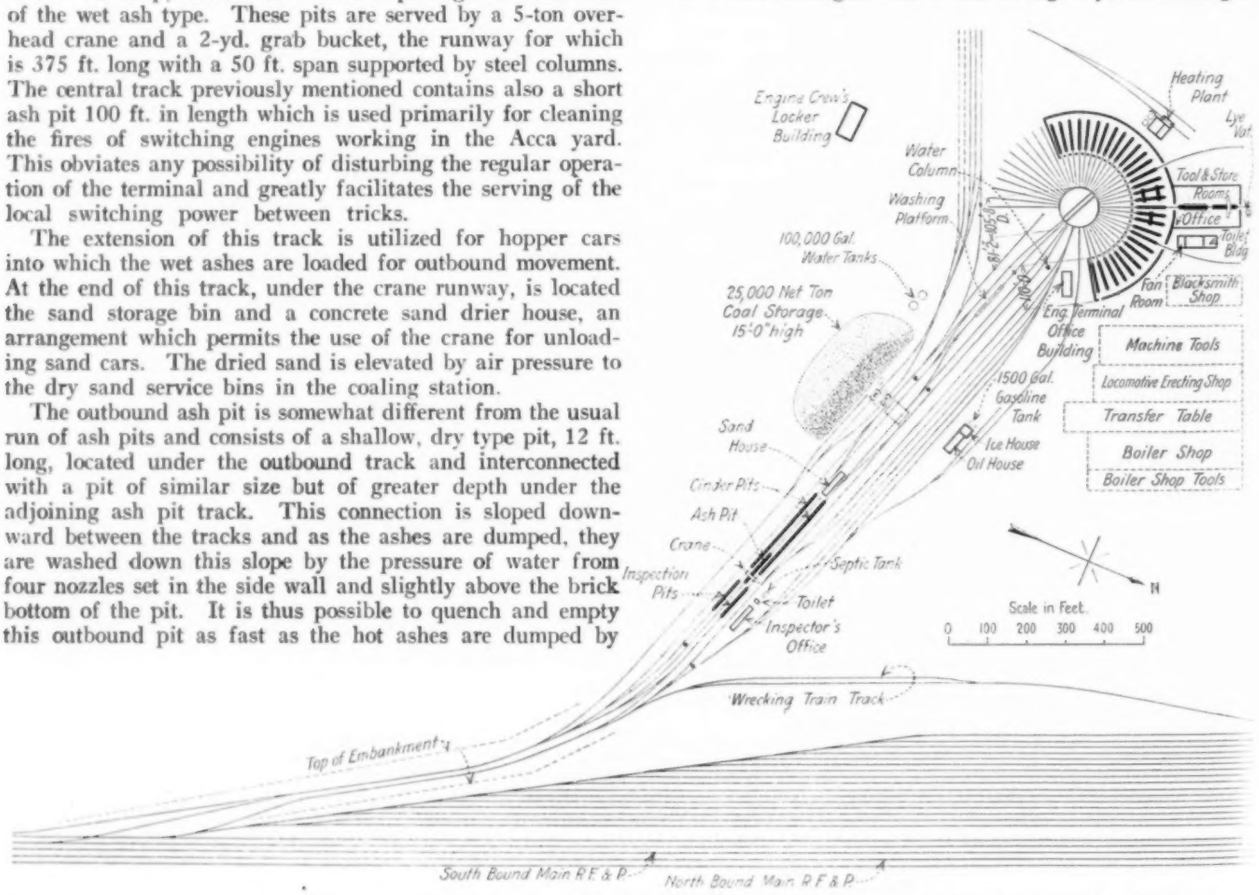
The extension of this track is utilized for hopper cars into which the wet ashes are loaded for outbound movement. At the end of this track, under the crane runway, is located the sand storage bin and a concrete sand drier house, an arrangement which permits the use of the crane for unloading sand cars. The dried sand is elevated by air pressure to the dry sand service bins in the coaling station.

The outbound ash pit is somewhat different from the usual run of ash pits and consists of a shallow, dry type pit, 12 ft. long, located under the outbound track and interconnected with a pit of similar size but of greater depth under the adjoining ash pit track. This connection is sloped downward between the tracks and as the ashes are dumped, they are washed down this slope by the pressure of water from four nozzles set in the side wall and slightly above the brick bottom of the pit. It is thus possible to quench and empty this outbound pit as fast as the hot ashes are dumped by washing them down into the deeper pit, from which they are removed by the grab bucket and the crane.

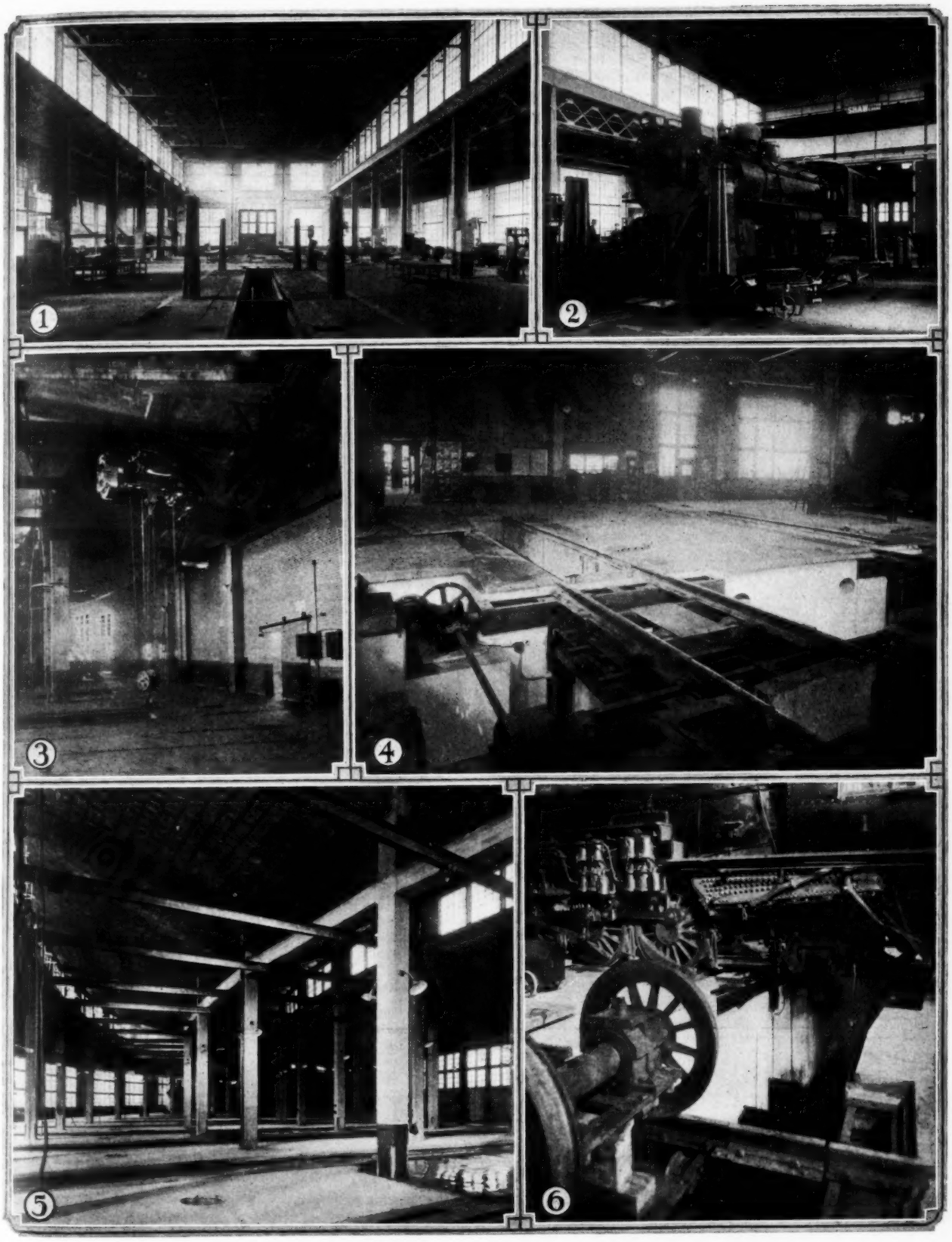
The Coal Storage Plant

The coaling plant has a capacity of 1,000 tons, serves four tracks at one time with individual weighing bins and Strait scales, and is equipped with dual hoisting facilities. It is arranged with two unloading tracks passing over hoppers and terminating in coal storage tracks which feed by gravity to the plant.

It is also arranged with a coal storage layout utilizing the



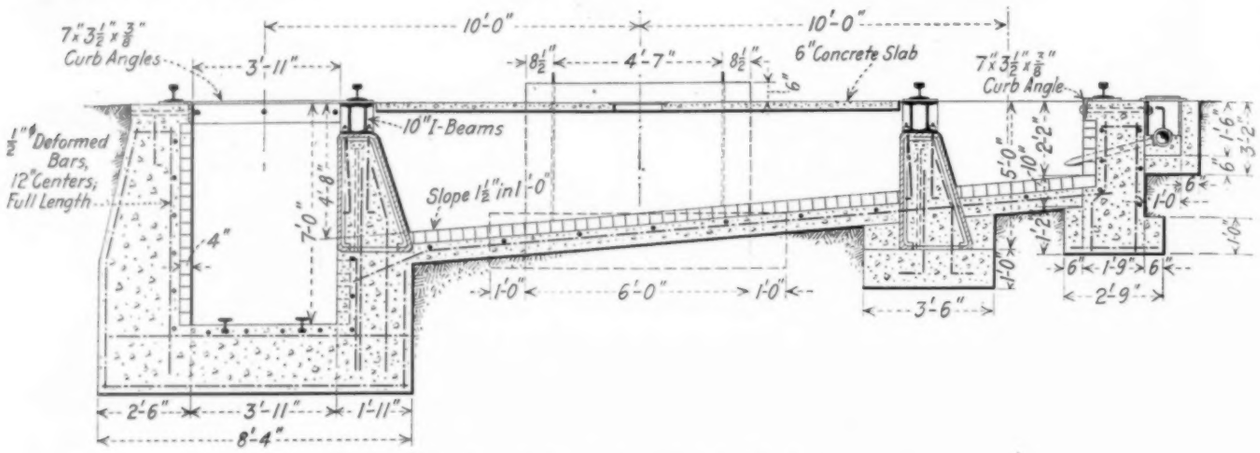
General Layout of the New Terminal in Relation to Acca Yard—Proposed Location of Back Shop Is Shown in Broken Lines



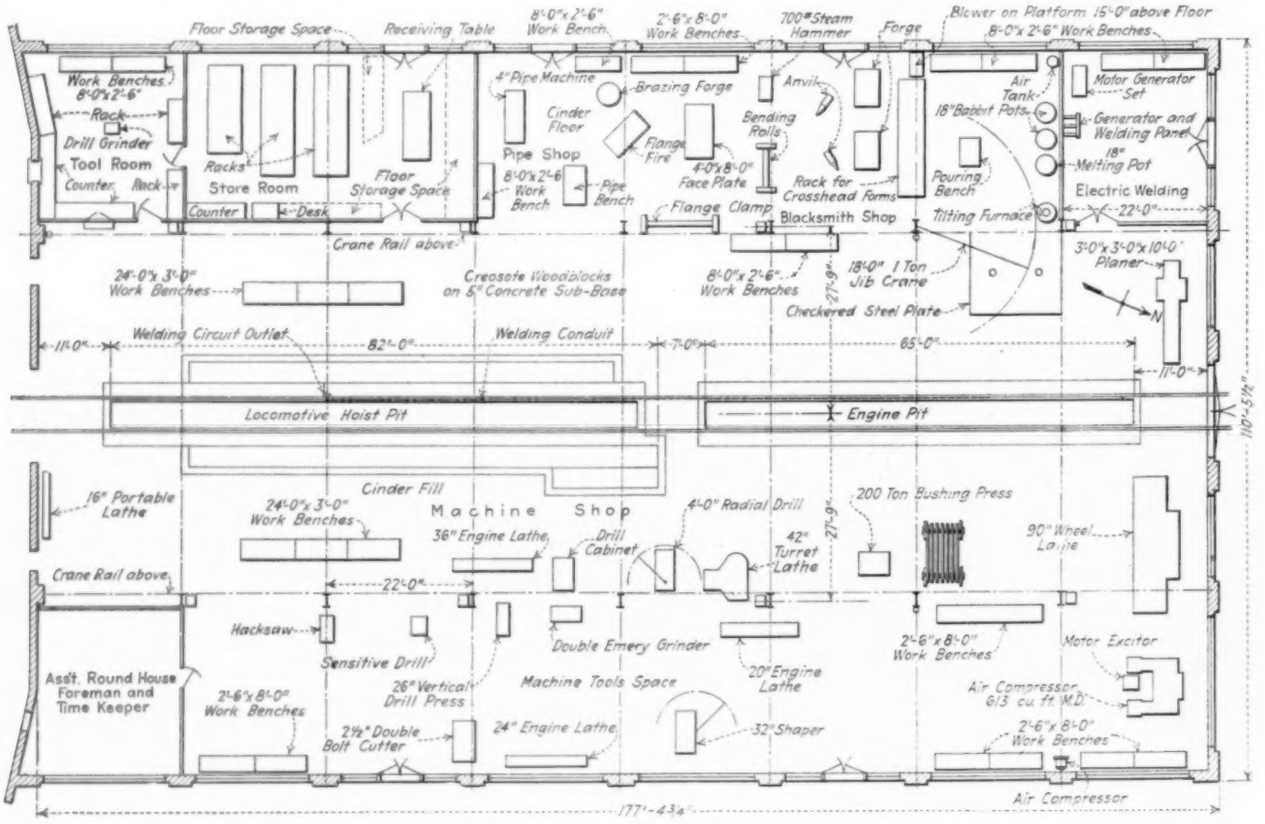
General Interior Views: 1. The Machine Shop Is Roomy and Well-Lighted; 2. A Whiting Hoist Facilitates Heavy Running Repairs; 3. The Arrangement of the Monorail and the Six-Ton Pawling & Harnischfeger Electric Hoist; 4. One of the National Bingham Drop Tables Uncovered; 5. The Enginehouse Interior and Facilities; 6. Unwheeling a Locomotive with the Drop Tables

Beaumont cable drag scraper system of handling the coal. This installation is similar to the one which the R. F. & P. has installed at its Potomac yard although much larger. With the area now used for storage this road can store about 25,000 tons of coal with an average depth of about 15 ft., which is approximately two months' supply for the terminal. This system has greatly reduced the number of cars formerly held for coal storage and has otherwise facilitated the coaling operations of the terminal. In utilizing it, coal is hoisted from the hoppers in the usual manner and then fed into a chute which discharges it on the ground outside of the coaling plant. The cable drag scraper picks up this coal and carries to any desired part of the storage yard, according to the anchoring of the distant end of the cable. Reversing the procedure, the scraper pulls in the coal, discharging it into the track hoppers of the coaling plant, whence it is elevated in the usual manner.

A reinforced concrete washing platform has been situated between the coaling plant and the turntable on one of the inbound leads. Several crossovers secure the necessary flexibility in operation to and from this platform. It is



A Cross-Section of the Outbound Ash Pit Arrangement

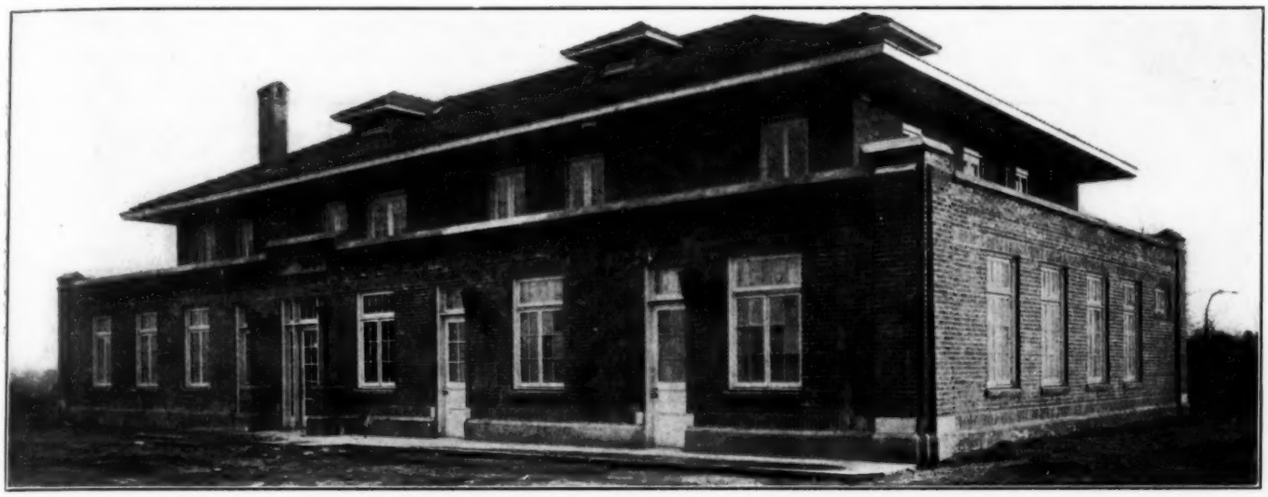


Machine Tool Layout in the Machine Shop

100 ft. long by 20 ft. wide and is fully equipped with pipe connections for air, steam, water and sewerage.

The enginehouse is a 30-stall structure with provision for the addition of 16 stalls when the necessity arises. The angle between tracks is 6 deg. 25 min., 42.8 sec., or the

equivalent of 56 divisions of a circle. The stalls are 110 ft. deep, with concrete engine pits 84 ft. long, inside dimensions. The clear door opening is 14 ft. wide by 17 ft. high and the distance from center to center of pilasters in the rear wall is 27 ft. 5⅞ in. The structure is of the monitor type with five bays, which are 19 ft. deep for the two nearest the inner circle and 24 ft. deep for the remainder. The monitor spans bays 3 and 4, counting from the inner circle, and has a roof structure which slopes toward the center. The roofs on the remaining bays slope downward toward the outside edges of the building.



The Engine Crew's Rest and Locker Building

The Enginehouse

The building is supported on concrete foundations and is of reinforced concrete column and girder construction above that, with the exception of the end walls and the rear walls between the concrete columns, where brick was used. All walls have been finished with a brick parapet and concrete coping. As heavy snowfalls do not have to be provided for, the roof structure is of comparatively light fireproof tile and reinforced concrete construction. The tiles were spaced four inches apart radially and the entire unit was poured as a monolith, the concrete being poured in and around the reinforcing between the tiles and to a depth of 2½ in. above them. This gave a roof structure of tile and reinforced beam construction, the beams being 4-in. thick and of a depth varying according to the depth of the tile used, of which three sizes were used. Six-inch tile was used on the two inner circle bays, 8-in. on the monitor and outer circle bays, except in certain sections of the latter where in view of the additional strength needed for an increased span brought about by a 6-ton monorail installation, 10-in. tile was used. The roofing is of the 4-ply built-up type.

Stalls 11 and 12 are served by two National-Bingham drop tables to handle drivers, and stalls 14 and 15 by hydraulic type pit jacks to handle trailer wheels and truck wheels. It is in these sections that the heavier roof construction is used, as the columns were eliminated in order to secure a clear opening between Nos. 11 and 12 and Nos. 14 and 15, for the installation of a 15-in. I-beam upon which 6-ton Pawlings & Harnischfeger hoists are operated. This installation circles the entire building approximately 10 ft. from the rear or outer circle wall, with switch leads to the drop pits and to the machine shop, which is joined to the enginehouse opposite stalls Nos. 11 to 15. Two of these hoists are provided. In this section the concrete beams are inverted; that is, they

The Incoming Engine Facilities Are Well Laid Out—the Inspection Pit in the Foreground

are carried above the roof level instead of below it. The long span brought about by the elimination of the columns necessitated the use of very heavy construction, the major beam at each pair of pit installations being 24 in. by 71 in. in cross-section, heavily reinforced, and approximately 50 ft. in length.

The engine pits are of concrete with a reinforced base 9 ft. 4 in. wide. White oak jacking timbers have been installed for the full length. The bottom of the pit is lined with paving brick, grouted, and across the low end, a 6-in. perforated baffle plate has been put in to prevent the clogging of drains by refuse. Each pit is served by two one-ton hand hoists operated on 10-in. I-beams set 10 ft. 6 in. center to center over each pit track and extending over the outer three bays to within 11 ft. 6 in. of the outer circle, or within 1 ft. 6 in. of the center line of the 6-ton monorail.

The enginehouse, and the machine shop as well, are heated by an indirect system discharging from two separate American blower installations into a concrete duct around the outer wall of the enginehouse and down through the machine shop. Six outlets are provided in each engine pit and additional outlets along the outer circle wall.

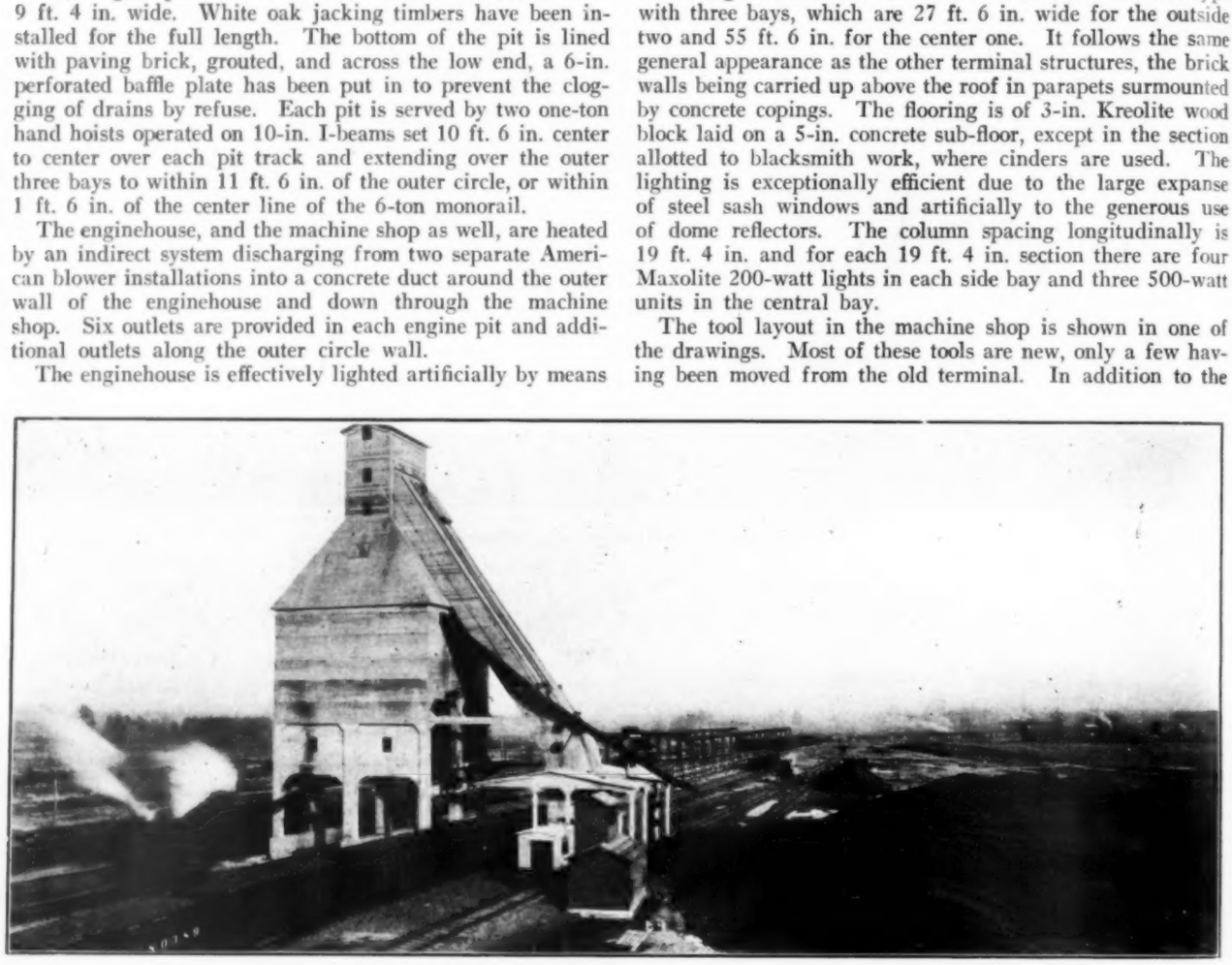
The enginehouse is effectively lighted artificially by means of Maxolite dome reflectors, using 100-watt lamps. Nine of these reflectors are used for each stall at a height of 12 ft. from the floor and an angle of 15 deg. From the inner circle, they are installed on a 1-1-2-2-2-1 arrangement, the single installations facing down the column line and the double installations facing to the sides, thus giving both longitudinal and side flood lighting at the rate of 900 watts per stall. All wiring is in conduit embedded in the concrete and plug receptacles have been provided in the pits and on the columns.

A National boiler washing plant with 18 ft. diameter by 16 ft. high wood tanks, serves one-half of the house, including stalls 16 to 30. The piping has been well arranged, one of the interesting features of this work being the suspension of a walkway alongside of the boiler washing service pipes, following the column line under the center of the monitor. Another interesting phase of the piping is the blower drops. These drops are made from American bronze encased, flexible hose with a Barco joint at each end, to relieve the hose of twisting strains, connecting with a Jenkins Selclo valve controlled from the floor by extension handles. Light guard rails encircling the posts prevent the hose from becoming entangled with the lighting fixtures.

The Machine Shop

The machine shop is connected to the enginehouse and is of steel frame, concrete and brick construction, measuring 177 ft. 4 in. long and 110 ft. 6 in. wide. It is of the monitor type with three bays, which are 27 ft. 6 in. wide for the outside two and 55 ft. 6 in. for the center one. It follows the same general appearance as the other terminal structures, the brick walls being carried up above the roof in parapets surmounted by concrete copings. The flooring is of 3-in. Kreolite wood block laid on a 5-in. concrete sub-floor, except in the section allotted to blacksmith work, where cinders are used. The lighting is exceptionally efficient due to the large expanse of steel sash windows and artificially to the generous use of dome reflectors. The column spacing longitudinally is 19 ft. 4 in. and for each 19 ft. 4 in. section there are four Maxolite 200-watt lights in each side bay and three 500-watt units in the central bay.

The tool layout in the machine shop is shown in one of the drawings. Most of these tools are new, only a few having been moved from the old terminal. In addition to the layout now being installed, the shop ultimately will be provided with an old 90-in. wheel lathe, a 3-ft. by 3-ft. by 10-ft. planer and a crank shaper, transferred from the old Boulton back shop, when the proposed new shop, shown in outline in the block plan, has been built and equipped. With a 100-ton Whiting hoist on the shop track, the engine terminal is now practically independent of the back shop for all heavy running repairs. It will also be used for heavy repairs to the new Mountain type locomotives, two of which have recently been delivered, until the new back shop has been built, as the erecting shop pits in the old shop are not of sufficient length to take in the new engines.



The Coaling Plant and Its Attendant Coal Storage

Other Buildings

Other buildings include a small combined power, heating and boiler washing plant; a combined heating plant and shop employees' locker and toilet facilities; an oil storage and ice house; an office building; an inspector's office building and an engine crews' rest and locker building. The oil delivery room on the first floor of the oil storage house contains 17 one-gallon Bowser measuring pumps, moved from

the old terminal, and two tanks for the preparation of car journal packing. A storage room with a capacity for 1½ cars of waste, is also located on this floor. The oil storage tanks are in the basement. The building is fitted with steam fire extinguisher pipes, separately controlled for each floor, from outside the building.

The engine crews' rest and locker building is particularly outstanding among the general run of such railway buildings, being an attractive structure both from the outside and inside. It is a two story structure of brick and concrete surmounted by a gabled roof of red shingle tile. The second floor has a wide balcony extending around three sides and over a small portico on the fourth. The first floor is divided centrally with a large reading and lounging room, on either side of which are the locker rooms and toilet facilities. Separate quarters are provided for the employees of the Richmond, Fredericksburg & Potomac and those of the Atlantic Coast Line and the Norfolk & Western. As the A. C. L. employs colored firemen, a small part of both the first and second floors has been set aside for them, completely detached from the remainder of the building and reached by separate entrances and exists. The second floor is divided generally into rooms of about 11 ft. 4 in. by 14 ft. 8 in. with four beds in each room. French doors lead from these rooms to the balconies. At one end is a kitchen, for the use of the men who wish to prepare hot food. It is equipped with a gas stove (oil is now being used temporarily), a modern sink and running water, a table and benches.

The Acca engine terminal is called upon to turn from 80 to 100 or more locomotives a day during the busy season. Of this number, about 24 are switch engines and the remainder are divided about equally between freight and passenger service. R. F. & P. locomotives constitute about 80 per cent of the power turned, the remainder being Atlantic Coast Line locomotives and the locomotives from two Norfolk & Western passenger runs between Norfolk and Richmond. With the exception of the engines operating in the Potomac Yard (Washington, D. C.), practically all of the 99 locomotives owned by the R. F. & P. depend on this terminal for running repairs.

Arrivals and departures are fairly well distributed throughout the 24 hours, with no marked peaks and no long periods of idleness. The heaviest periods are probably those between six and nine o'clock in the morning and five and eight o'clock in the evening. During the former period, on the basis of a total daily movement of 80 engines through the terminal, 10 to 12 road engines and 9 yard engines are despatched, and 8 road engines arrive at the inspection pits. During the latter period, 12 road engines are despatched and 10 or more road engines arrive at the ash pit. The heavy afternoon switch engine movement takes place between four and five o'clock. The coal issued runs about 550 tons a day, or an average of about 7 tons per locomotive turned, including the switch engines.

It is evident that, with no future additions, the terminal is capable of effectively handling a much larger engine movement than it is now called upon to do, and that the outside facilities have ample capacity to balance the increased size of the roundhouse, when conditions require the building of the additional stalls. Something of the future for which this capacity has been provided, is indicated by the fact that the northbound perishable movement, which now constitutes, roughly, one-quarter of the total freight tonnage of the road, has been doubling, approximately once in every five years.

The new terminal was developed and constructed under the direction of W. D. Duke, general manager; H. J. Warthen, superintendent motive power; L. Budwell, mechanical engineer, and E. M. Hastings, chief engineer. The plans were prepared and the construction carried out by the Arnold Company, Chicago, working with the railroad.

I. C. C. Power Brake Investigation Reopened

After Tests on Norfolk & Western Bureau of Safety Finds A. S. A. Brake Adequate

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on February 25 began a new hearing in connection with its investigation of the adequacy of the power brakes now used by the railroads, with particular reference to the merits of the brake device of the Automatic Straight Air Brake Company, for the purpose of receiving testimony as to the results of a series of tests of the A. S. A. brake conducted by the Bureau of Safety of the commission, by its order, on the Norfolk & Western in July and August of last year. A number of railroad executives were also called by the commission and questioned as to why they should not display greater activity in investigating the merits of the new brake or the possibilities of improvement in braking apparatus. During this questioning a suggestion was made by Commissioner Potter indicating a possibility that the commission might call upon the roads to equip several thousand cars with the automatic straight air brake for the purpose of giving it more extensive and thorough service tests and the executives were asked whether they would be willing to co-operate in such test.

The railroad officers who testified during the first three days of the hearing were W. L. Mapother, president of the Louisville & Nashville; W. J. Jackson, president of the Chicago & Eastern Illinois; Julius Kruttschnitt, chairman of the Southern Pacific; N. D. Maher, president of the Norfolk & Western, and C. W. Galloway, vice-president of the Baltimore & Ohio. C. E. Chambers, superintendent of motive power and equipment of the Central of New Jersey, also testified as chairman of the committee on safety appliances of the Mechanical Division of the American Railway Association. In general the executives expressed the opinion that the present standard air brakes are satisfactory, and that the new brake has not demonstrated either a superiority over or an equality with the present brakes sufficiently to justify their adoption. They expressed a willingness to join with other roads in having more conclusive tests made, and Mr. Jackson and Mr. Maher said they had tried to obtain from the Automatic Straight Air Brake Company enough brakes for a more extensive test than they have already been given on those roads.

The hearing was conducted by Examiner Mullen. Commissioner Potter also took an active part in the questioning, and Commissioners Cox, Esch, Lewis, McChord and McManamy were present part of the time.

A complete report of the tests on the Norfolk & Western was submitted by W. P. Borland, director of the Bureau of Safety, who also gave detailed testimony regarding the tests and was cross-examined by C. C. Paulding, of the New York Central, Alfred P. Thom, Jr., general solicitor of the Association of Railway Executives, and Paul Synnestvedt of the

Westinghouse Air Brake Company. Mr. Borland's report expressed the following conclusions:

1—The A. S. A. brakes as installed, maintained and tested on the Norfolk & Western, are adequate for safely controlling both loaded and empty trains on that road.

2—When used in trains partly equipped with Westinghouse brakes, the A. S. A. brakes operated sufficiently in harmony with the Westinghouse brakes to effect the proper control of both loaded and empty trains.

3—When operated in graduated release, the A. S. A. brake provides an efficient means of controlling trains on grades and permits of relatively uniform rates of speed being maintained.

4—With A. S. A. brakes absolute uniformity of brake cylinder pressures was not obtained, but variations in brake cylinder pressures was not excessive.

5—With A. S. A. brakes piston travel, in a measure, affects brake pipe reductions and brake cylinder pressures, but not sufficiently, when maintained between operative limits, to be a factor of importance.

6—When A. S. A. brakes have been applied by a light service reduction and brake pipe pressure is further reduced by leakage and the operation of the A. S. A. triple valves, brake cylinder pressures continue to increase until full-service brake cylinder pressures are obtained, the time required being determined by the rate of brake pipe pressure reduction.

7—With A. S. A. brakes emergency brake cylinder pressures were obtained as desired in emergency tests including emergency application following service reductions and an emergency application following service and release; the availability of the emergency operation of the A. S. A. brakes immediately following a service application or immediately following a service application and release of the brakes, is desirable as a means of increasing the safety of freight train operation.

8—Abnormally high brake cylinder leakage was created in standing tests to determine the ultimate limit within which it is possible to release the A. S. A. brakes. High brake cylinder leakage results in relatively long periods of time being required to effect a release of A. S. A. brakes when in graduated release position. On a standing 75-car train brake cylinder leakage of approximately 17 lb. per minute on each car did not prevent the release of brakes after service reductions of 8 lb. and 20 lb.; brake cylinder leakage on two cars near the rear of the train equivalent to the amount of air which could be supplied by the triple valves did not prevent release of the train brakes after service reduction of 8 lb. and 20 lb.; brake cylinder leakage on three cars near the rear end of the train equivalent to the amount of air which could be supplied by the triple valves did prevent the release of the brakes on the rear end of a 75-car train after a 20-lb. service reduction when all triple valves were in graduated release position.

Mr. Borland's Statement

In an introductory statement Mr. Borland said:

"At the outset it appears desirable to state that the purpose of this proceeding is not to determine any controversy between air brake companies or between carriers and manufacturers of air brake apparatus. As stated in its order of February 20, 1922, the commission upon its own motion instituted this proceeding of inquiry and investigation to determine whether, and to what extent, power brakes and appliances for operating power brake systems now generally in use upon the locomotives and cars of carriers by railroads subject to the interstate commerce act are adequate and in accordance with requirements of safety, what improved appliances or devices are available for use, and what improvements in power brakes or appliances may or should be made to the end that increased safety in train operation may be obtained.

"The original safety appliance law, enacted more than 30 years ago, requires trains to be controlled by means of power brakes. The commission is charged with the administration of that law. In its annual reports to Congress the commission has, on a number of occasions, called attention to difficulty which has been encountered in securing compliance with the requirements of that law, particularly in respect to the control of freight trains on grades by means of power brakes. In addition, the Bureau of Safety has investigated and reported upon numerous serious train accidents which might have been prevented had not the power brake equipment in use been faulty or inadequate. Notwithstanding measures which we have taken to secure compliance with the law, the use of hand brakes has been continued in certain locations, the contention being advanced that such use of hand brakes is necessary as an additional precaution and to provide a suitable factor of safety. The experience of a great majority of roads having heavy grades is convincing that trains can be controlled by power brakes exclusively, as required by law. In view of the increase in weight of cars and tonnage and length of trains in recent years, one of the principal purposes of this proceeding is to determine whether the development of power brake apparatus has kept pace with increasing service requirements or whether from the standpoint of safety improvements are necessary, either in the air brake apparatus itself, or in its maintenance and methods of operation, or in other respects.

"Under other provisions of law various power brake devices have been submitted to us for examination and some of them have been subjected to service tests. With respect to such devices the Bureau of Safety's interest lies in determining whether or not they can be successfully used in association with present equipment, and if so whether their use would result in increased safety and efficiency of railroad operation. One of the purposes of this proceeding is, therefore, to determine what improved appliances or devices are available for use, and it is from this viewpoint that the devices of the Automatic Straight Air Brake Company are being considered.

"At the former hearings held in connection with this investigation representatives of the A. S. A. Brake Company appeared and presented evidence alleging that certain defects were present in power brake devices in common use. They called attention to the records of development, experiments and service use of A. S. A. brake devices and contended that the more general use of their devices would afford freedom from a number of the troubles now commonly experienced and would result in material improvement in power brake operation.

"Other parties appearing in this proceeding contended that the A. S. A. brake devices were in an experimental stage, that the service tests to which they had been subjected had not been sufficiently extensive to warrant final conclusions, that the tests and demonstrations of these devices on the Norfolk & Western were conducted under exceptionally favorable conditions and did not represent usual service conditions, and that no tests or demonstrations had been made under a number of varied service conditions commonly encountered in railroad service.

"After the earlier hearings had been completed, the commission, in order to determine certain questions concerning the operation of A. S. A. brake devices on the N. & W., decided that tests of these devices should be conducted by the Bureau of Safety for the purpose of obtaining definite and reliable information as to their operation, and the accomplishment of their intended functions under service conditions.

"With the co-operation and assistance of the N. & W. a schedule of tests was prepared. This schedule provided for the operation of trains in regular service between Bluefield and Norfolk, including one 50-car loaded train equipped with A. S. A. brake devices, and one train made up of A. S. A.

and Westinghouse cars mixed; of 100-car and 75-car mixed empty trains, and of 75-car A. S. A. trains. While in the earlier N. & W. tests a 70-car train was used, and in the Virginian tests a 100-car A. S. A. train was operated, it was not considered necessary in this instance, nor was it deemed desirable by the railroad company, to operate double-tonnage trains, and the loaded trains were therefore limited to 50 cars in accordance with current practice on the N. & W. In the empty trains a maximum of 75 A. S. A. cars was fixed on account of difficulty and delay which would have been caused by assembling a greater number. The cars used in the test trains were taken from regular service without special preparation other than to instal apparatus necessary in the conduct of the tests.

"The primary objects of these tests were twofold. At the earlier hearings in this proceeding, the contention was advanced that the A. S. A. brakes instead of increased safety and efficiency, were dangerous and should not be permitted to be used in service. One of the primary objects of the tests was, therefore, to determine and demonstrate whether or not this brake as installed on the N. & W. was safe and adequate for the control of trains. The other primary object was to establish definitely whether or to what extent certain desirable functions claimed for this brake, the practicability of which had been questioned, were accomplished in service."

Then followed a description of the tests, regarding which Mr. Borland said in effect:

Description of Tests

The tests were begun on July 22 and completed on August 18, 1923.

The locomotive used in these tests was a 2-8-8-2 Mallet having standard Westinghouse ET equipment, two 8½-in. cross-compound compressors and a main reservoir capacity of 75,500 cu. in.

On the Radford and Norfolk divisions of the N. & W. it is the practice to use main reservoir pressure of 120 lb. and brake pipe pressure of 70 lb. except eastbound from Bluefield to Roanoke where the brake pipe pressure is increased to 80 lb.

The cars used were 100-ton capacity steel gondolas equipped with six-wheel trucks and having a light weight of approximately 54,000 lb. The A. S. A. brake cars were equipped with A. S. A. type S-2 triple valves which were installed on the cars when they were built in 1920. The Westinghouse cars were equipped with K-2 triple valves. All cars had 10-in. cylinders.

In operating the test trains the existing practice of the N. & W. in handling similar trains was followed as closely as practicable. It is the practice on this road to adjust piston travel to between six and eight inches and descending the Bluefield and Allegheny grades to turn up all retainers, while on the Blue Ridge grade retainers are used on the first 15 cars.

The trainagraphs used in these tests register pressures in brake pipe, brake cylinder and auxiliary or emergency reservoir. Trainagraphs were installed on cars in 50-car trains at intervals of 5 cars, and on 75 and 100-car trains at intervals of 10 cars. Dial gages showing brake pipe and brake cylinder pressures were also installed on each car equipped with a trainagraph and each car upon which instruments were installed was in charge of one of the commission's observers whose duty it was to note any discrepancy in the pressures shown by the trainagraph and the dial gages, and to note and record shocks or other unusual occurrences.

Purpose of Tests

The purpose of these tests was to determine and demonstrate the following specific questions concerning the operation of the automatic straight air brake equipment as used on the N. & W.:

A—Control of loaded train by means of Automatic Straight Air brake equipment.

B—Control of empty train by means of Automatic Straight Air and Westinghouse brake equipment mixed.

C—Control of empty train by means of Automatic Straight Air brake equipment.

D—Effect upon operation of Automatic Straight Air triple valves of long and short piston travel in different parts of same train.

E—Minimum brake application that can be made with Automatic Straight Aid brake equipment with long piston travel.

F—Minimum brake application that can be made with Automatic Straight Air brake equipment with short pistol travel.

G—Minimum brake application that can be made with Automatic Straight Air brake equipment with standard piston travel.

H—Effect of brake cylinder leakage upon operation of Automatic Straight Air brake equipment.

I—Control of loaded train by means of Automatic Straight Air and Westinghouse brake equipment mixed.

Different series of tests were conducted to demonstrate each of these questions.

Series A Tests

This series, to demonstrate control of loaded trains by means of Automatic Straight Air brake equipment, consisted of the operation of a 50-car train, loaded with coal, equipped with Automatic Straight Air brake devices, from Bluefield, W. Va., to Lambert Point (Norfolk), Va. This train was operated in accordance with rules and practices of the N. & W., and certain brake operations in addition to those required for the control of the train were made for test purposes.

As shown by the records, this loaded train was controlled without damaging slack action or excessive shocks. The brake operations included light, medium and heavy service applications as well as emergency applications which were made under various conditions for test purposes, and while some irregularities in the operation of the A. S. A. brake devices were noted, these differences from the intended operations were not of sufficient magnitude or consequence to prevent safe and adequate control of the test train.

On Bluefield and Allegheny grades the speed was maintained between reasonable limits and without sudden variations. On Blue Ridge grade, higher rates of speed were attained, and there was little it any braking power in reserve when the train reached the foot of the grade; this, however, was due to the fact that when descending this grade the triple valves on 35 cars were in quick release position and the method followed in the manipulation of the engineman's brake valve did not provide for recharging the train brake system. As shown by the chronograph record, the longest period that the engineman's brake valve was in release position in the four cycles made while descending this grade was 1.3 sec.; it was in running position a total of 3 min. and 14 sec., while it was in lap position a total of 6 min. and 32 sec. Under these conditions both brake pipe pressure and pressure in auxiliary reservoirs on cars having triple valves in quick release position were materially depleted. Had an emergency arisen at or near the foot of the grade it is doubtful whether this train could have been brought to a stop as promptly as required.

In the four emergency operations which were made for test purposes on this train, emergency brake cylinder pressures were obtained and the train was in each instance stopped without heavy shock. The time from movement of brake valve to emergency position until brake cylinder pressure of 10 lb. developed on car 50 varied from 11 sec. to 14.2 sec. Emergency operation was secured following a service reduction, and in another test following release after a service application. In these tests there was no undesired release of brakes following an emergncy application.

Series B Tests

These tests, to demonstrate control of train of empty cars having Westinghouse and Automatic Straight Air brake equipment mixed, consisted of the operation of a train of 100 empty cars from Lambert Point to Crewe, Va.; this train was made up of 37 A. S. A. cars on the head end and 38 A. S. A. cars on the rear end, with 25 Westinghouse cars in the middle of the train; also the operation of a 75-car empty train from Roanoke to Bluefield, the first 25 and the last 25 being equipped with Westinghouse triple valves and 25 cars in the middle of the train being equipped with Automatic Straight Air triple valves. Various adjustments of piston travel were made en route and a number of brake operations were made for test purposes.

In the service tests in this series, which were made on August 1, the time of serial operation in application throughout the 100-car train was from 38 to 47 sec. The brake on car 1 was slow in applying; the record for each service test shows that it did not apply until several seconds after the brake on car 30 had applied. In the emergency test at 15 miles per hour the time of serial action was 10.8 sec. In several tests on this date there was considerable shock from slack running in, due largely to the time required for the brakes to apply on the rear portion of the train, and was also contributed to by the fact that in most of these tests the throttle was closed practically at the time the application was started and before the train was bunched, the heavy locomotive creating a strong retarding force. In the emergency application in test 7-B, the shock was enough to cause damage to equipment.

In this connection it should be noted that the schedule provides that "All running tests except on Bluefield, Allegheny and Blue Ridge grades will be made when the train is accelerating or running at constant speed." The purpose was to determine the operation which would occur under specified conditions rather than to demonstrate excellence of operation under favorable conditions.

In test 101-B, which consisted of a service application followed by an emergency application, emergency operation was obtained on the A. S. A. cars in the forward part of the train but did not carry through the block of Westinghouse cars in the middle of the train. On the rear part of the train, as brake pipe pressure leaked

down a number of the A. S. A. brakes automatically applied in emergency.

On the following day in service tests the time of serial operation varied from 32 to 55 sec., and in emergency application it was 15.9 sec. In these tests the severity of the shocks due to slack running in was reduced by leaving the throttle open until the train stopped. In test 15-B, which consisted of a 5-lb. service application, the brakes on observation cars 41, 51 and 61 applied in emergency. These were all Westinghouse cars. Emergency operation did not occur on cars 29 and 72, the A. S. A. observation cars on each side of the block of Westinghouse cars.

On August 16, with the 75-car mixed train, the time of serial operation in service tests varied from 26 to 43 sec., and in emergency tests from 11 to 12.2 sec. In these tests the throttle was left open until the train stopped, thereby reducing shocks due to slack running in. In addition to running tests, three emergency applications were made with the train standing, one of them starting from the rear end of the train, and all emergency tests, both running and standing, emergency operation carried throughout the train.

Series C Tests

This series, to demonstrate the control of train of empty cars by means of Automatic Straight Air brake equipment, consisted of the operation from Crewe to Roanoke of a 75-car empty train having Automatic Straight Air brake equipment. Various brake operations were made en route for test purposes.

For the tests in this series, on August 3 and 4, the records of time of serial operation are incomplete owing to trouble with the electric circuits for the contact gages. Such records as there are, however, indicate that the time of serial operation in service applications was from approximately 24 to 38 sec. There were six emergency applications in this series, but in none of them is there an accurate record of the time of serial operation; in two of the emergency tests on August 4, the record indicates that the brake on the 75th car applied at the time of stop or shortly afterward, the train being stopped in these two instances in 13 and 11.5 sec., respectively, after the emergency application was made. In the other instance on that date the record indicates the brake did not apply until several seconds after the train stopped, or more than 20 sec. after the emergency application was made.

In test 5-C on August 4, consisting of a 10-lb. service reduction, the slack ran out with sufficient force to break the knuckle on the rear end of car 75, causing an emergency application. The emergency operation was recorded on cars 75 and 64 but did not carry forward to the next observation point, car 54.

In making the tests in this series the throttle was left open in each case until the train was stopped. In most cases the train was stopped with but little shock; in emergency applications which were made at speeds of approximately 15, 10 and 7 miles per hour, heavy shocks were noted but little if any damage resulted.

Series D, E, F and G

The tests in these series were made with a 75-car train, having Automatic Straight Air brake equipment, standing in a yard at Roanoke; different adjustments of piston travel were made to determine the effect of such adjustments upon the operation of Automatic Straight Air triple valves. The tests in these four series were conducted twice for comparative purposes.

In the tests in Series D, with long piston travel in certain parts of the test train and short piston travel on other blocks of cars, there was considerable variation in initial brake cylinder pressures; for example, in test 1-D the initial brake cylinder pressures varied from 10 to 31 lb.; after one minute, however, the brake cylinder pressures on observation cars ranged generally between 30 and 40 lb. In several tests in this series, auxiliary reservoir pressure was not maintained, but on cars where the operation was not interfered with by this condition relatively uniform brake cylinder pressures developed within one minute after application of the brakes. There were substantially as great variations in brake cylinder pressures, both initially and after one minute, on cars having long piston travel as on cars having both short and long piston travel; for example, in test 2-D, the initial brake cylinder pressure on car 20, having 10 in. piston travel, was 11 lb., as compared with 24 lb. on car 50 also having 10 in. piston travel; the brake cylinder pressures on these two cars after one minute were 30 and 34 lb., respectively. In this test the minimum and maximum initial pressures on cars having short piston travel were respectively, 15 lb. on car 10 having 5-in. piston travel and 25 lb. on car 1 having 6-in. piston travel; on cars having long piston travel 10 lb. on car 30, having 9.5-in. piston travel, and 24 lb. on car 50 having 10-in. piston travel. Brake cylinder pressures on all observation cars were between 25 and 42 lb. after one minute, and between 42 and 50 lb. after two minutes. In some of the tests the brakes did not respond to initial brake pipe reductions of 3 lb.; only a part of them responded to the initial 5-lb. reductions.

In all the tests in these three series, brake cylinder pressures on observation cars built up to between 35 and 45 lb. within three minutes. In test 101-G, the brakes began to apply approximately 1½ min. after the angle cock on the rear of tender was closed, and initial brake cylinder pressures varied from 10 to 25 lb.

Tests of Series H

These tests also consisted of standing tests in the yard at Roanoke and included various brake operations with different adjustments of brake cylinder leakage, to determine the effect of brake cylinder leakage upon the operation of Automatic Straight Air brake equipment.

In the first group of tests in this series, brake cylinder leakage on each car was adjusted to approximately 10 lb. per minute, and in the second group to 17 lb. per minute. As a result of the 8-lb. reductions, in tests 1-H and 3-H, initial brake cylinder pressures on observation cars ranged from 7 to 25 lb.; in tests 6-H and 8-H initial brake cylinder pressures ranged from 9 to 28 lb. The brake cylinder pressures after one minute were, in tests 1-H and 3-H, from 24 to 35 lb., and in tests 6-H and 8-H from 33 to 44 lb. The time of release of the brake on car 75 was 32.54 sec. in test 1-H and 170.89 sec. in test 6-H; in test 3-H the time of release on car 75 was 4 min., and 15.53 sec., and in test 8-H it was approximately 5 min. on car 70. For this test the triple valve on car 75 was inadvertently left in quick release position.

From the 20-lb. reductions, in tests 2-H and 4-H the maximum brake cylinder pressures on observation cars were between 40 and 50 lb., and in tests 7-H and 9-H, between 40 and 48 lb. The time of release on car 75 was, in test 2-H, 22.17 sec., and in test 7-H, 31.3 sec.; in test 4-H, 125.62 sec., and in test 9-H, 3 min. and 46 sec.

In the emergency applications, the brake cylinder pressures on observation cars at the expiration of 5 min. were, in test 5-H, between 23 and 36 lb., and in test 10-H, between 17 and 30 lb.

There were four groups of tests in this series in which conducting pipes to brake cylinders on specified cars were disconnected for the purpose of creating brake cylinder leakage equivalent to the amount of air which could be supplied by the triple valves. As the amount of this leakage was increased the time required for releasing and recharging was relatively increased; with all triple valves in graduated release position and with the conducting pipes on three cars in the rear portion of the train disconnected, the brake on car 75 was released after an 8-lb. service reduction in test 23-H, in 10 min. 33.3 sec.; in test 24-H, in which a 20-lb. service reduction was made, the brakes on the rear of the train were not released.

Series I Tests

These tests, to demonstrate the control of loaded train having Westinghouse and Automatic Straight Air brake equipment mixed, consisted of the operation from Bluefield to Roanoke of a 50-car train loaded with coal, made up as follows: 10 cars equipped with Westinghouse triple valves; 10 cars equipped with A. S. A. triple valves; 10 cars equipped with Westinghouse triple valves; 10 cars equipped with A. S. A. triple valves; 5 cars equipped with Westinghouse triple valves and 5 cars equipped with A. S. A. triple valves. This train was operated in accordance with the rules and practices of the N. & W. and certain brake operations in addition to those required for the control of the train were made for test purposes.

In controlling this train on Bluefield grade seven brake applications were made; as a result of the first application the train was nearly stopped, but following this the speed of the train was maintained between 17 and 25 miles per hour until the beginning of the seventh application for the stop at Blake. On Allegheny grade 15 applications were made, including those made to stop at Elliston switch and on Elliston siding, and the speed of the train was maintained between 16 and 26 miles per hour.

Two emergency tests were made; in the first, at Pembroke, the time of serial operation was 8.3 sec. and maximum brake cylinder pressures on observation cars were from 61 to 70 lb.; in the second, approaching Salem, the time of serial operation was also 8.3 sec., and maximum brake cylinder pressures on observation cars were from 57 to 70 lb. Throughout this run the train was controlled practically without shock.

Throughout the tests there were frequent instances of auxiliary reservoirs leaking, resulting in failure to develop the intended brake cylinder pressure, or in brakes wholly or partially leaking off. This operation it is believed was due to a feature of design or construction of the A. S. A. triple valve which permitted auxiliary reservoir to remain in communication with the brake pipe after an application was made. The time of serial action of the A. S. A. brakes was longer than is considered desirable and the tendency of this longer time of serial action is to increase the length of stop and, within certain limits, to produce slack action of a damaging character. However, in the emergency tests with the 50-car loaded A. S. A. trains the slack action was not severe. In emergency tests with the 75-car A. S. A. empty train, from speeds of approximately 15, 10 and 7 miles per hour, respectively, steam was used throughout the entire length of stops, which were made without material damage.

The tests made with various amounts of brake cylinder leakage demonstrated that the effect of this condition is to cause brake cylinder pressures to continue to increase after an application has been made, to the point of equalization, the rate of increase depending upon the rate at which brake pipe pressure is being reduced by brake pipe and brake cylinder leakage combined; and while in some instances the time required to effect a release is increased, the tendency is for effective brake cylinder pressures to be built up and maintained rather than for only part of the proper brake cylinder pressures to be obtained and that quickly lost through leakage.

Testimony of Executives

W. L. Mapother, president of the Louisville & Nashville, was the first of the executives to testify at the request of the commission. Before replying to Commissioner Potter's questions he made a preliminary statement saying that he was not qualified, either by education or practical experience, to give reliable testimony with respect to the mechanical features of air brake systems or their numerous functions, but could only testify from the viewpoint of an executive officer charged with the duty of supervising the adoption of equipment or mechanical devices who has always attempted to keep in constant touch with the operations and familiarize himself with respect to the development of equipment and appliances, in which he has invariably had the full benefit of the knowledge and experience of thoroughly qualified mechanical officials. His superintendent of machinery, C. F. Giles, he said, has served on the Committee on Safety Appliances, Mechanical Division, American Railway Association, which committee has made exhaustive studies of air brake systems and devices, and is still a member of such committee.

The Louisville & Nashville's experience with the Westinghouse air brake system now being employed, Mr. Mapother said, has been and is entirely satisfactory. "While it may not, perhaps, be 100 per cent perfect it is, we believe, as nearly so as human skill can devise. I have no knowledge of any disastrous or serious accidents on the Louisville & Nashville lines in recent years attributed directly to any inherent weakness or faulty design of the air brake system which we have employed. The Westinghouse air brake system has met the most exacting requirements for a generation. While the air brake principles are fundamentally the same as they were ten to twenty years ago the details—especially the triple valve—have undergone a constant improvement. It is my understanding that the principal claim for superiority advanced for the automatic straight air is the ability of the engineer to obtain a full emergency application of the brakes immediately after a full service application and immediately after release, but, in my opinion, this claim has not been substantiated in any of the actual tests observed by the mechanical representatives of the L. & N. R. R. Co. What is claimed for the automatic straight air is produced by the Westinghouse U. C. (Universal Control) equipment which is used on passenger trains. It is my opinion that such alleged feature of superiority is not essential for the safe operation of freight trains. I do not believe our freight trains could be controlled more successfully or efficiently than they are controlled by the equipment now in use.

"The query naturally arises—if the automatic straight air has performed, or will perform, all of the superior functions claimed for it, why has it not been generally adopted? My answer to this is that its superiority has not been demonstrated. The automatic straight air brake was first brought to the attention of the L. & N. management in 1917, and has been thoroughly and repeatedly considered by our mechanical experts. In view of the conclusions of our mechanical and operating officials, the management has not felt justified in seriously considering the substitution of automatic straight air for the devices now employed, nor do I think such consideration would be warranted until such time as the alleged perfection and superiority of the automatic straight air shall have been abundantly demonstrated beyond peradventure.

"I subscribe unreservedly to the conclusions of the sub-committee and the special representatives appointed to aid the sub-committee in observing the test of automatic straight air, as set forth in the report dated October 3, 1923, namely:

"1. That the automatic straight air brake possesses no new features which are either desirable or practicable in general train operation. During the course of the hearing in this proceeding claims were made that this brake possessed certain features which the standard brake equipment did not have. In the Norfolk & Western test certain of the features which were claimed for this brake did not function properly and other features claimed for it were not shown to be present in this equipment.

"2. That the efficiency of brake operation in general service would be decreased rather than increased by the use of a brake possessing the characteristics of the automatic straight air brake equipment. This is shown by the performance of the trains equipped solely with A. S. A. brakes, and is further demonstrated by the fact that in the mixed trains the functional operation of the brake equipment improved as the number of A. S. A. brakes were diminished and the number of standard brakes were increased in the train."

Mr. Jackson said that the Chicago & Eastern Illinois had been using the latest type of New York air brakes, and that the reports indicated that they had been satisfactory. The company had also endeavored to keep in touch with other types and had applied the A. S. A. brakes to 11 passenger cars. The reports had indicated that these had operated satisfactorily and there had been no complaints, but it had been impossible to keep these cars together, and they had been scattered in with cars equipped with other brakes. It was felt that more cars ought to be equipped in order to ascertain just what the brakes would do, but the A. S. A. company could not supply additional equipment. He had no information as to their operation on freight cars. Commissioner Potter said there had been much conflict in the testimony, to the effect that the standard brakes are antiquated, and that the A. S. A. represents an improvement and also to the contrary, and that the commission felt that before deciding the case it ought to have the testimony of some of the executives who are responsible for results. "We ought to know how they feel about this and what they have been doing," he said. "There is some feeling that the executives ought to be up and doing. We want to know what they are doing or their justification for doing nothing and why they do not adopt this brake."

Mr. Jackson then referred to the inability to get more of the brakes and said the railroads had a committee to look into these things and satisfy themselves as to the merits. Mr. Potter asked if experience had indicated the need of a better air brake and if the brake equipment had kept pace with the development of large locomotives and longer trains. Mr. Jackson replied that his road had not had much air brake trouble, and that the information received from the mechanical officers is that the present brakes are doing all that can be expected of them although not 100 per cent perfect. Commissioner Potter then asked Mr. Jackson to express his opinion of a suggestion that, supposing the commission should be convinced that the time has come for a step forward and should want another study or should think that the executives should take up the matter vigorously, the railways should arrange to equip several thousand cars with the new brake for further tests. Mr. Jackson replied that that would be "all right," and that his road would be willing to pay its proper share of the expense, and he replied in the affirmative to a question as to whether if such a test should demonstrate marked superiority he would deem it his duty to adopt the brake.

Mr. Jackson was cross-examined by E. E. Clark, counsel for the A. S. A. company, as to whether he would accept the judgment of his employees who had worked with the brake, and said that it is better and safer than the standard brake. Mr. Jackson said such expressions would be given due consideration, but that the judgment of the responsible officers and experts would be acted upon rather than that of subordinates. When Mr. Clark asked why the attitude of railroad managements has been "consistently antagonistic to the adoption of improved devices" Mr. Jackson said he did not think it had been although they had at times opposed certain legislation for various reasons and largely because of the expense involved.

Cross-examination of Mr. Borland by Mr. Synnestvedt followed Mr. Jackson's testimony. Mr. Borland declined to answer questions involving a comparison of the standard and the A. S. A. brakes, saying the tests had not been conducted for that purpose. Mr. Synnestvedt then said it would be necessary to abandon his line of questioning because he wanted to ask about his analysis of the results of the tests, "which showed in every particular the inferiority of the A. S. A. brake," he said, in a way that did not support the conclusions of the Bureau of Safety report. Commissioner Potter said that he might ask the questions and that the commission could probably draw some conclusions from the witness' refusal to answer in certain cases or from his manner in replying. Commissioner McManamy suggested that Mr. Synnestvedt try to bring out his points through a witness of his own, and the subject was dropped.

C. E. Chambers testified that he had appointed a subcommittee and a committee of observers consisting mainly of air brake experts to witness the Norfolk & Western tests, and had instructed them to co-operate in every way. After the tests were completed a report was compiled which had been sent to President Aishton of the American Railway Association. Wilbur La Roe, Jr., of counsel for the A. S. A. brake company, asked a number of questions to show that the A. R. A. committee has not conducted any air brake investigation for fifteen years. Mr. Chambers said that there had been no occasion for such tests, and that although he had known of the A. S. A. brake for eight or ten years, and had looked into it nothing had indicated to him any serious occasion to take it up. The latest improvement in the K-triple valve brake seemed to meet the requirements. The committee had never had any request from the A. S. A. company for a test, and during the last year the American Railway Association had made a formal offer to make a test. In reply to questions by W. J. Patterson, assistant to Mr. Borland, Mr. Chambers said that the experience of the Central of New Jersey with the standard brakes had been satisfactory, and that in his opinion the availability of capacity for an emergency application following a service application would be disastrous in 5,000 cases to one where it would be an advantage. When Mr. Patterson cited an accident on his road Mr. Chambers said that in that case the engineer had "frittered his air away" and lost control of his train on a down grade so that no brake could have stopped him.

Mr. Kruttschnitt, after citing statistics to show how few accidents had occurred on the Southern Pacific in proportion to the traffic, said that there is "absolutely no reason for making any change whatever in the brake system." He said that the Southern Pacific afforded a severer test of brake equipment than other roads, and described its practices in inspecting brakes and in educating the employees in their proper use. In general the policy of the company is to pay little attention to untried devices and unsupported claims, and although he had on several occasions sent experts to witness tests of the A. S. A. brake they had not been convincing or conclusive. He did not think that progress in the development of the air brake has fallen behind that of other features of operation, although he said the railroads should not get into a frame of mind of believing that no further improvements can be reached. The Southern Pacific has adopted improvements in the Westinghouse brake where they have been proven.

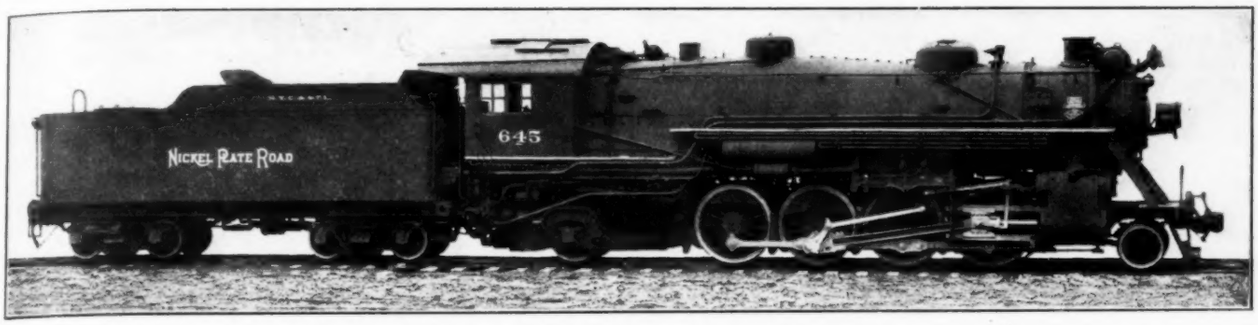
Commissioner Potter asked Mr. Kruttschnitt if he knew of any influence having been exerted on the company to confine its purchases to the standard brake. The latter replied that Mr. Harriman had spoken to him several times about dividing their patronage between the Westinghouse and New York companies, but that tests were made and the latter did not show up satisfactorily. When Mr. Potter asked his opinion of the suggestion for equipping several thousand cars Mr. Kruttschnitt said he thought a much better plan would be to conduct tests under various conditions on test racks such as those used on the Southern Pacific to educate its men in the proper use of brakes, because if the cars with the A. S. A. brakes were scattered and used with other brakes it would be difficult to draw conclusions. With the racks, he said, it is possible to reproduce all kinds of conditions.

Testimony of N. D. Maher

Mr. Maher said that the present standard equipment on the Norfolk & Western has resulted in safe operation, and he did not believe that new brakes should be required until they have proved themselves. Four years ago, he said, the A. S. A. Company had made certain claims as to its brake, and he had ordered them for 250 new cars, but the company had been able to furnish only enough for 100 cars. These were used in tests in 1921, and then placed in service with other cars where no particular record has been kept of their performance. He had also sought to obtain brakes for seven dining cars. Then the cars were used in the recent tests conducted by the Bureau of Safety, and the reports had indicated to him that the brakes had worked "erratically" and not satisfactorily enough to justify their adoption. Although capable of further development, he thought they had not been shown to give better results than the standard equipment. He thought the A. S. A. Company should be given further time to develop its brake and to furnish more cars with it, but that Commissioner Potter's suggestion would result in a hardship on the roads which he saw no necessity for.

If the brake company could bear the expense it might be done, but he thought the railroads would hesitate to spend money for something that at the best is only just as good as what they now have. Mr. Clark, on cross-examination, asked in what way the tests showed unsatisfactory results, and when Mr. Maher said that the train was not as well handled as their ordinary trains Mr. Clark said that abnormal conditions were imposed purposely. Mr. Patterson also said that the train had been started out with braking conditions "as bad as possible," and that it had been "used as roughly as possible."

Mr. Galloway described braking conditions on the Baltimore & Ohio, and said the company is having no brake trouble on heavy grades with trains of as many as 135 cars. He said he had been unable to get information to emphasize the necessity for trying the A. S. A. brake, and that he saw no advantage in the principal claim made for it as to its capacity for an emergency application following a service application. The A. S. A. Company has a chance, he said, to convince the executives it thinks are skeptical by accepting the offer of the American Railway Association and putting it on the test racks. Instead of continuing the controversy the railroads and the company should get together and each invest a reasonable amount to develop the facts. As he now understands the situation he thought the Baltimore & Ohio would be unwilling to associate the automatic straight air brake with its standard brakes.



These Nickel Plate Mikados Weigh 318,000 lb. and Have a Tractive Force of 54,700 lb. Without the Booster

Two Light Mikado Locomotives Built at Lima

Designed for Local Conditions but Approximately Same Capacity as U. S. R. A. Light Mikados

SLIGHTLY MORE THAN HALF of the 534 Mikado locomotives ordered in the year 1923 weighed less than 320,000 lb., despite the fact that the past few years has shown a marked tendency toward the adoption of heavier designs of the 2-8-2 type. Among the orders for locomotives placed by the United States Railroad Administration, there were included 625 light Mikados and 244 heavy Mikados, which were distributed among many roads. The U. S. R. A. light Mikado had a tractive force of 54,600 lb. and weighed 290,800 lb., of which 221,500 lb. were on the drivers. The cylinders were 26 in. by 30 in. and the conical wagon-top boiler carried 200 lb. steam pressure. These locomotives have served as the bases for a number of later designs, which were modified to suit local conditions.

The two locomotives described herewith are of approximately the same general capacity as the U. S. R. A. light Mikados, but differ considerably in details. Both are equipped with boosters and feedwater heaters.

N. Y. C. & St. L. Mikado

In 1923, the Lima Locomotive Works built 30 Mikado locomotives for the Nickel Plate, which were intended for fast freight service. The railroad company desired an engine of the general size of the U. S. R. A. light Mikado, but designed to embrace railroad standards and special features which had been found by them to be desirable and essential in the successful operation of similar engines on its road. In general, the design was the same as that of the previous lot from the same builder.

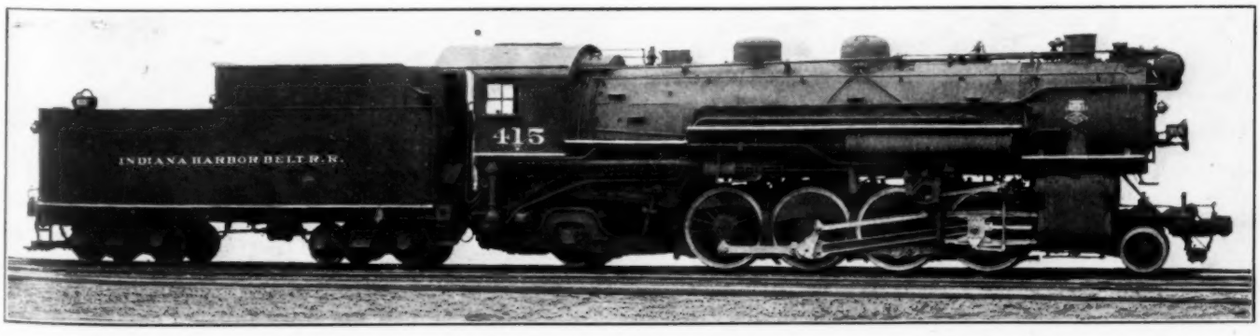
The boiler is of the conical wagon-top type and is 78 in. outside diameter at the front end and 90 in. outside diameter at the throat. It has 216 2¼-in. diameter tubes and 40 5½-in. diameter flues. The tubes and flues are 19 ft. long outside of the tube sheets and there is a 24-in. combustion chamber.

The firebox is of the wide, radial stayed type and is 114⅛ in. long and 84¼ in. wide, and has a grate area of 66.7 sq. ft. There is a Security arch supported on four 3-in. steel tubes. Franklin Butterfly No. 9 type fire door is provided. The boiler is equipped with a Type A superheater having 40 units with a heating surface of 882 sq. ft. The grates are the railroad company's standard rocking type and are shaken by Franklin grate shaker cylinders. Commonwealth cast steel ash pans are used.

The cylinders are 26 in. diameter with a 30 in. stroke. The piston valves are 14 in. diameter and fitted with Hunt-Spiller packing rings. The valves are actuated by a Baker-Pilliod valve gear and a Franklin Railway Supply Company's Precision reverse gear.

The crosshead is of the alligator type with Hunt-Spiller gun iron shoes lined with babbitt. The crosshead pin is made of chrome-vanadium steel with grease lubrication. The crank pins and the side and main rods are made of chrome-vanadium steel.

The main frame is of vanadium cast steel 6 in. wide, with a single front rail cast integral. The back frame is the Commonwealth cast steel, one-piece cradle and is designed to provide for the application of the Duplex D-2 stoker. Driving box shoes are of bronze and Franklin automatic adjustable wedges are applied. The frames are thoroughly



These Indiana Harbor Belt Mikados Weigh 304,500 lb. and Have a Tractive Force of 54,000 lb. Without the Booster

cross-braced with a series of cast steel crossties. The front end has Commonwealth cast steel front bumpers with Type D couplers and extended shelf type coupler pockets. The back end has a Type D radial buffer between engine and tender.

The engine truck is of the constant resistance type with a cast steel bolster and 33-in. forged steel wheels. The trailing truck is of the latest Commonwealth Delta type, fitted with a booster. The wheels are 43 in. diameter.

One half of this order has the Elesco feedwater heater and the other half the Worthington feedwater heater. All

Table of Dimensions, Weights and Proportions

Railroad	N. Y. C. & St. L.	I. H. B.
Builder	Lima Loco Works	Lima Loco Works
Type of locomotive	2-8-2	2-8-2
Service	Freight	Freight
Cylinders, diameter and stroke	26 in. by 30 in.	25 in. by 32 in.
Valve gear, type	Baker	Baker
Valves, piston type, size	14 in.	14 in.
Weights in working order:		
On drivers	238,100 lb.	231,000 lb.
On front truck	21,200 lb.	24,000 lb.
On trailing truck	58,700 lb.	49,500 lb.
Total engine	318,000 lb.	304,500 ib.
Tender	188,800 lb.	185,700 lb.
Wheel bases:		
Driving	16 ft. 9 in.	16 ft. 6 in.
Total engine	36 ft. 11 in.	35 ft. 7 in.
Total engine and tender	72 ft. 1½ in.	70 ft. 3½ in.
Wheels, diameter outside tires:		
Driving	63 in.	63 in.
Front truck	33 in.	33 in.
Trailing truck	43 in.	45 in.
Boiler:		
Type	Con. wagon top	Straight top
Steam pressure	200 lb.	200 lb.
Fuel	Soft coal	Soft coal
Diameter, first ring, outside	78 in.	81⅝ in.
Firebox, length and width	114⅛ in. by 84¼ in.	108⅛ in. by 75¼ in.
Arch tubes, number and diameter	4—3 in.	4—3 in.
Combustion chamber length	24 in.	None
Tubes, number and diameter	216—2¼ in.	257—2 in.
Flues, number and diameter	40—5½ in.	36—5⅜ in.
Length over tube sheets	19 ft. 0 in.	20 ft. 6 in.
Grate area	66.7 sq. ft.	56.5 sq. ft.
Heating surfaces:		
Firebox and comb. chamber	253 sq. ft.	202 sq. ft.
Arch tubes	27 sq. ft.	28 sq. ft.
Tubes and flues	3,497 sq. ft.	3,780 sq. ft.
Total evaporative	3,777 sq. ft.	4,010 sq. ft.
Superheating	882 sq. ft.	870 sq. ft.
Comb. evaporative and superheating	4,659 sq. ft.	4,880 sq. ft.
Tender:		
Water capacity	10,000 gal.	10,000 gal.
Fuel capacity	15 ton	16 ton
General data estimated:		
Rated tractive force, 85 per cent	54,700 lb.	54,000 lb.
Rated tractive force with booster	65,900 lb.	64,800 lb.
Cylinder horsepower (Cole)	2,434	2,252
Speed at 1,000 ft. piston speed	37.5 m.p.h.	35.1 m.p.h.
Coal rate per sq. ft. grate per hour	118.8 lb.	129.6 lb.
Weight proportions:		
Weight on drivers ÷ total weight engine, per cent	74.9	75.9
Weight on drivers ÷ tractive force	4.35	4.27
Total weight engine ÷ cylinder hp.	130.5 lb.	135.2 lb.
Boiler proportions:		
Comb. heat surface ÷ cylinder hp.	1.91	2.16
Tractive force ÷ comb. heat. surface	11.74	11.06
Tractive force × dia. drivers ÷ comb. heat. surface	740	697
Cylinder hp. ÷ grate area	36.5	39.9
Firebox heat. surface ÷ grate area	4.2	4.07
Firebox heat. surface, per cent of evap. heat. surface	7.42	5.74
Superheat. surface, per cent of evap. heat. surface	23.35	21.70

are equipped with Westinghouse No. 6 E.T. brake with American Brake Company's foundation brake and two 8½-in. cross-compound air compressors.

Indiana Harbor Belt Mikado

The boiler used on the Indiana Harbor Belt locomotives is of the straight top type and is 81⅝ in. in diameter outside at the front end and 85 in. in diameter outside at the throat. It has 257 2-in. tubes and 36 5⅜-in. flues, which are 20 ft. 6 in. long over the tube sheets. A combustion chamber is not provided. The firebox is of the wide, radial stayed type and is 108⅛ in. long by 75¼ in. wide, and has a grate area of 56.5 sq. ft.

There is a Security arch supported on four 3-in. steel tubes, and a Franklin clam-shell No. 9 type of fire door is applied. The locomotive is equipped with a Type A superheater, having 36 units with a heating surface of 870 sq. ft.

The grates are the railroad company's standard type and are rocked by hand in four sections. Built-up ash pans with steel hopper and plate body are applied. A Chamber's throttle valve is placed in the smoke box. The cylinders are 25 in. in diameter with a 32-in. stroke. The piston valve is 14 in. in diameter with gun iron packing rings.

The valves are actuated by a Baker-Pilliod valve gear and a Ragonnet, Type B, power reverse gear.

The crosshead is of the alligator type with Hunt-Spiller gun iron shoes lined with babbitt. The crank pins and the main and side rods are made of normalized carbon-vanadium steel.

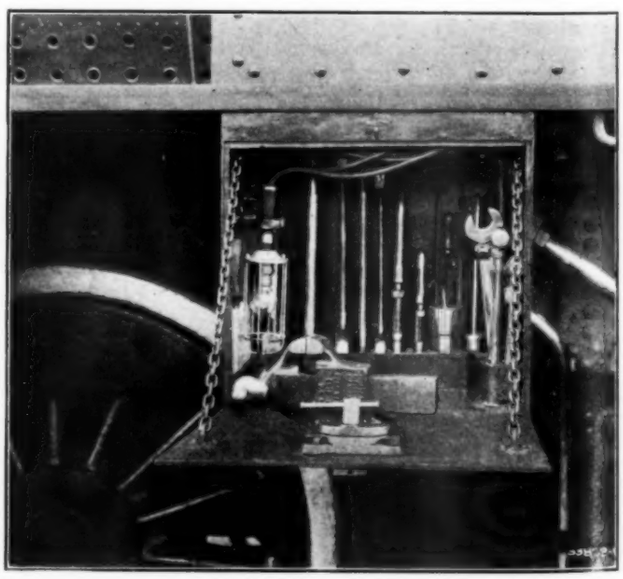
The main frame is of cast steel, 5 in. wide and placed 42 in. center to center, and with the front rail cast integral. The back frame is the Commonwealth cast steel, one-piece cradle, and is made to provide for the application of a Duplex, D-2, stoker. No stoker, however, are on these engines, as yet.

The driving box shoes are of bronze and Franklin adjustable wedges are applied. The frames are thoroughly cross-braced with a series of cast steel crossties. The front end has a Commonwealth cast steel front bumper with Type D couplers and extended shelf coupler pocket. The back end has a Type D radial buffer between the engine and tender.

The engine truck is of the standard three-point suspension, swing link, type. The trailing truck is of the latest Commonwealth Delta type and is fitted with a booster.

All the locomotives are equipped with the latest type of Elesco feedwater heater.

The accompanying table gives the leading dimensions, weights and proportions of both the N. Y. C. & St. L. and the I. H. B. Mikados.



Keystone

Tool Chests Like This Are Being Installed on All D. T. & I. Locomotives

Analysis of Equipment Maintenance Expenses

Reviewing the Information Available in the Accounts and Explaining Methods for Its Use

By J. L. White

Formerly Assistant Controller, United States Railroad Administration

THE HIGH COST of maintaining equipment has been the serious concern of railway executives for the past decade. Although most of the present high costs of railroad operation may be attributed to conditions growing out of our entry into the war, the tendency for maintenance of equipment expenses to increase more rapidly than revenues or other operating expenses had become noticeable several years earlier.

This situation was ably presented in an article in the *Railway Age* of December 22, 1923, entitled "Equipment Maintenance Out of Proportion" and the statistics therein presented indicate the need for careful and continuous analysis of these expenses. The purpose of this article is:

First, to review the items included under Maintenance of Equipment expenses under the Interstate Commerce Commission Classification of Operating Expenses, and

Second, to outline the various steps to be followed in making a comprehensive analysis of fluctuations in these expenses in one period compared with another.

Primary Maintenance of Equipment Accounts

The following table gives the primary accounts included under the general account "Maintenance of Equipment." To facilitate this discussion, the accounts have been arranged by groups containing similar expenditures. The amount of each account for all Class I roads in 1922 has been given in order to indicate the relative importance of each item.

Account No.	Description	Amount in 1922 for all class I roads	
1.	Equipment Repairs:		
	A. Motive Power—		
308	Steam locomotives—repairs	$439,636,746	
311	Other locomotives—repairs	2,415,982	
320	Motor equipment of cars—repairs	1,553,911	
	B. Cars—		
314	Freight train cars—repairs	407,565,747	
317	Passenger train cars—repairs	78,258,405	
	C. Other Equipment—		
323	Floating equipment—repairs	10,663,818	
326	Work equipment—repairs	14,921,280	
329	Miscellaneous equipment—repairs	260,766	
	Total equipment repairs		$955,276,655
2.	Equipment Depreciation and Retirements:		
	A. Depreciation—		
309	Steam locomotives—depreciation	$41,467,318	
312	Other locomotives—depreciation	609,347	
321	Motor equipment of cars—depreciation	477,810	
315	Freight train cars—depreciation	83,492,899	
318	Passenger train cars—depreciation	12,123,738	
324	Floating equipment—depreciation	2,657,103	
327	Work equipment—depreciation	3,350,781	
330	Miscellaneous equipment—depreciation	77,501	
	Total depreciation	$144,256,497	
	B. Retirements—		
310	Steam locomotives—retirements	$2,518,243	
313	Other locomotives—retirements	.....	
322	Motor equipment of cars—retirements	8,536	
316	Freight train cars—retirements	13,306,185	
319	Passenger train cars—retirements	422,421	
325	Floating equipment—retirements	503,333	
328	Work equipment—retirements	768,769	
331	Miscellaneous equipment—retirements	34,603	
	Total retirements	$17,562,090	
	Total equipment, depreciation and retirements		$161,818,587
3.	Shop and Power Plant Machinery Repairs and Depreciation:		
	A. Repairs—		
302	Shop machinery	$19,008,025	
304	Power plant machinery	4,306,615	
306	Power substation apparatus	163,517	
	B. Depreciation—		
303	Shop machinery—depreciation	338,890	
305	Power plant machinery—depreciation	462,728	
307	Power substation apparatus—depreciation	88,964	
	Total shop and power plant machinery repairs and depreciation		$24,368,739
4.	Supervision and Miscellaneous Expenses:		
301	Superintendence	$39,928,836	
332	Injuries to persons	4,685,503	
333	Insurance	7,201,101	
334	Stationery and printing	2,167,907	
335	Other expenses	53,591,348	
	Total supervision and miscellaneous		$107,574,695
5.	Joint Facility Accounts and Equalization:		
336	Maintaining joint equipment at terminals—Dr.	$5,938,354	
337	Maintaining joint equipment at terminals—Cr.	*2,395,724*	
338	Equalization Cr.	*64,056*	
			$3,478,574
	Total maintenance of equipment expenses		$1,252,517,250

SUMMARY

			Per cent
1.	Equipment repairs	$955,276,655	76.27
2.	Equipment depreciation and retirements	161,818,587	12.92
3.	Shop and power plant machinery repairs and depreciations	24,368,739	1.94
4.	Supervision and miscellaneous	107,574,695	8.59
5.	Joint facility accounts and equalization	3,478,574	.28
	Total maintenance of equipment	$1,252,517,250	100.00

1. Equipment Repairs.

The equipment repair accounts constituted 76 per cent of the total maintenance of equipment expenses of Class I railways in 1922 and it is with this group that we are chiefly concerned. These accounts are made up principally of expenditures for labor and material used in repairing the rolling stock and floating equipment. The entire cost of putting bad order equipment in serviceable condition is, however, not always chargeable to maintenance expenses. If the repair job involves an addition or an improvement in the original construction of the unit, the expense is divided between maintenance expenses and capital account.

As a concrete example, let us suppose that we have a freight car in need of heavy repairs to the underframe, which is of wood. If these repairs are made in kind, that is, if the worn out wooden sills are replaced with new wooden sills and there is no betterment of the original condition of the car, it is a repair job and the entire cost is charged to maintenance of equipment. On the other hand, if it is decided to strengthen the original condition of the car by replacing the wooden sills with a steel underframe, the cost of the job is divided between maintenance of equipment and capital account. The charge to expenses is based on the estimated cost of replacing the wooden sills in kind and the difference between this amount and the total cost of the job is charged to capital account.

In cases where the repairs are so extensive as to constitute a practical rebuilding of the car, the accounting rules of the Interstate Commerce Commission provide that the old unit shall be written out of the accounts just as if it had been destroyed and the rebuilt unit shall be written in just like any other new unit of equipment. On the account of

the extensive conversion of old wooden cars into steel underframe cars in recent years, the effect of this provision of the classification has been to understate the cost of keeping equipment (chiefly freight train cars) in serviceable condition. Consequently high as these repairs have been, they would have been even higher if it had not been for this provision of the classification.

2. Equipment Depreciation and Retirements.

This group of accounts constituted 13 per cent of Maintenance of Equipment expenses of Class 1 roads in 1922. They do not represent actual expenditures of labor and material. The "Depreciation" accounts represent bookkeeping charges to expenses and concurrent credits to a balance sheet reserve established for the purpose of offsetting the loss in value of the various units of equipment as carried in the investment account of the carrier due to obsolescence and depreciation that cannot be overcome even by proper maintenance. If the proper amount of depreciation has been accrued on a unit of equipment and it finally becomes necessary to retire the unit, the amount deducted from the investment account representing the ledger value of the unit will be offset by other assets consisting of the salvage plus cash or other property into which the income withheld by the monthly charge to depreciation has been converted. To the extent that the ledger value is not offset by the salvage and depreciation reserve, it becomes necessary to charge the appropriate "Retirements" account to make up for the under-accrual of depreciation. On the other hand, if the sum of the salvage and the depreciation reserve is greater than the ledger value of the unit, a credit is made to "Retirements" account to offset the over-accrual of depreciation.

It is evident that "Depreciation" and "Retirements" accounts are both in effect depreciation accounts, with the difference that the "Depreciation" accounts represent uniform monthly charges made in advance to anticipate a loss, while the "Retirements" accounts represent adjustment of depreciation accruals made after the unit of equipment has been retired and the over- or under-accrual of depreciation has been determined.

The practical working out of the accounting for depreciation and retirements is set forth in the following example:

Let us assume a freight car costing $1,000 in 1915, with an expected life of 20 years and an estimated net salvage value of $200. Under the accounting rules of the Interstate Commerce Commission, the depreciation problem in 1915 was to determine the percentage which applied to the original cost would set up uniform annual accruals which in 20 years would equal $800.

Original cost ($1,000) less salvage ($200) equals depreciation reserve ($800) at 20 years.

$800 divided by 20 equals $40, the annual depreciation accrual.

$40 is 4 per cent of $1,000; hence the depreciation rate in this case would be 4 per cent.

Three typical cases of accounting that might be necessary in connection with the retirement of such a unit are as follows:

1. Assume that in 1935, after 20 years' service, the car is worn out and is retired with the anticipated salvage value of $200. No charge to "Retirements" would be required, because the salvage of $200 added to the depreciation reserve of $800 equals $1,000, the ledger value of the car, and there is no loss in assets when the car is written out of the investment account.

2. On the other hand, assume that the car did not live out its expected life, but was retired in 1930, after 15 years of service, with the same salvage value as in case 1. There would be a charge to "retirements" of $200 to equalize the under accrual of depreciation as the reserve after 15 years would only amount to $600 instead of $800 as in case 1.

	Case 1	Case 2	Case 3
1. Original cost (ledger value)	$1,000	$1,000	$1,000
2. Depreciation reserve at date of retirement	$800	$600	$800
3. Net salvage value	200	200	300
4. Total depreciation and salvage	$1,000	$800	$1,100
5. Required charge of credit to "retirements" (Items 1—4)	....	Dr. 200	Cr. 100

3. Another situation frequently arises whereby the salvage at the date of retirement is greater than had been anticipated, say $300 instead of $200 for this particular car. If the car was retired under these conditions after 20 years' service, there would be a credit of $100 to "Retirements."

These three cases are summarized in the table at the bottom of the first column.

3. Shop and Power Plant Machinery Repairs and Depreciation.

These accounts include the cost of repairs and charges to depreciation for shop machinery and tools at the repair shops, power plants and sub-stations. Representing maintenance of fixed property as distinguished from rolling stock or floating equipment, these accounts seem out of place among the accounts relating to maintenance of equipment and should properly be included in maintenance of way and structures. In fact, in the accounting analyses of the maintenance accounts of the carriers made by the United States Railroad Administration, this group of accounts was included with the maintenance of way accounts instead of with the maintenance of equipment accounts. The entire group constituted but 2 per cent of the total maintenance of equipment expense of Class 1 roads in 1923 and is relatively unimportant.

4. Supervision and Miscellaneous.

In this group will be found the cost of supervision of the forces engaged in maintenance of equipment and miscellaneous expenses such as Injuries to Persons (chiefly employees hurt in shops), Insurance, Stationery and Printing, and Other Expenses. The last named account—Other Expenses—is usually a small item but assumed large proportions in 1922 on account of the shop strike. Special police protection, guards and other unusual expenses due to the strike were charged to this account which amounted to $53,591,348 for Class 1 roads in 1922 as compared with $625,096 in 1921.

5. Joint Facility Accounts and Equalization.

These accounts represent the expense of maintaining joint equipment at terminals. In the case of an individual carrier, the credit account represents the amount billed by it against other carriers covering their share of the cost of maintaining engines, cars or other equipment used in joint service at terminals, the total cost of which was included in the primary accounts of the carrier. The debit account represents amounts billed against the carrier for its share of the cost of repairs to joint equipment at terminals, the total cost of which was included in the primary account of other carriers.

As might be expected these two accounts largely offset each other for all Class 1 roads the net debit being due to charges from terminal companies not included in the statistics for Class 1 roads.

Equalization expenses represent adjustments to equalize the uniform monthly accruals that may be made for some items of expense with the actual expenditures for those items. The amount is relatively small and the account is not very generally used.

Reviewing the items included in the five groups of expenses just described, we find that group 1, Equipment Repairs, consists chiefly of expenditures for labor and material. Group 2, Depreciation and Retirements consists of bookkeeping charges which do not represent actual cash expenditures. Group 3, Shop and Power Plant Machinery Repairs and Depreciation contains both labor and material expenditures and charges for depreciation and retirements. Group 4, Supervision and Miscellaneous, contains items consisting of labor and material charges as well as miscellaneous expenditures such as insurance premiums, cost of stationery and printing, damage claims for injuries, special police protection (as in the case of the strike in 1922), etc. Group 5,

relatively small in amount, consists principally of bills between carriers for cost of maintaining joint equipment and adjustments of monthly accruals.

It is evident from the dissimilarity of the items in the various groups that a different method of analysis must be followed for each group and that the extent of the study will depend upon the details available in explanation of the items included in each account.

Methods of Analysis

1. Equipment Repairs.

The expenses of this group are made up principally of charges for labor and material, and it is, therefore, important to determine the extent to which fluctuations therein are due to changes in the following items:

1. Rates of pay of labor.
2. Prices of material.
3. Hours of labor.
4. Quantity of material applied.

Prior to 1916, the changes from year to year on account of the first two items were not ordinarily substantial and did not require special attention in general analyses of the cost of equipment repairs. Since 1916, however, fluctuations in rates of pay and prices of material have been very great so that these two factors cannot be ignored in even the most general analysis.

The separation of the causes of these fluctuations into the four elements named above is not difficult when the necessary details are available and is essentially a mathematical computation. The difficulty lies in determining whether the differences in hours worked and quantity of material applied in the periods under consideration are properly accounted for by differences in the amount of repair work done.

The nature of the problem can best be illustrated by the following simple analysis of a typical repair account. For the sake of simplicity, miscellaneous charges are omitted, as they are not ordinarily large except in the case of freight car repairs, which should be given special consideration.

TABLE 2

Comparison of Typical Repair Account in Period A and Period B

	Period A			Period B			Increase	
	Quantity	Total	Average	Quantity	Total	Average	Quantity	Cost
Labor	1,000 hrs.	$800	$0.80	800 hrs.	$480	$0.60	200 hrs.	$320
Material	720 lb.	432	.60	600 lb.	180	.30	120 lb.	252
Total		$1,232			$660			$572

The problem is to divide the increase of $572 into the four elements given above, as viz.:

1. Rates of pay,
2. Prices of material,
3. Hours worked,
4. Quantity of material applied.

1. Rates of Pay—
The hours worked in Period B are extended at the rates of pay in Period A, and from this amount the actual cost in Period B is deducted.
800 hrs. @ $0.80 ..... $640
Actual cost of labor in Period B 480
Increase due to change in rates of pay $160

2. Prices of Material—
The pounds of material applied in Period B are extended at the prices in Period A, and from this amount the actual cost in Period B is deducted.
600 lb. @ $0.60 ..... $360
Actual cost in Period B 180
Increase due to changes in price of material 180

3. Hours worked—
The balance of the increase in labor due to additional hours worked is 160
This amount can be checked by applying the rate of pay in Period A to increase in hours
(200 hrs. @ $0.80 = $160)

4. Quantities of Material Applied—
The balance of the increase in material due to additional material applied is 72
This amount can be checked by applying the price of material in Period A to the increase in pounds applied
(120 lb. @ $0.60 = $72)

Total increase in labor and material $572

The study of the causes for the increase due to the first two factors, viz., rates of pay and prices of material is not ordinarily a part of an analysis of equipment repair costs and can be limited to the determination of the fact of such increases. It is therefore with the study of the causes for the increase in the last two items that the troubles of the analyst begin.

In the example given above, we have established an increase of 200 hours or 25 per cent and an increase of 120 lb. of material applied, or 20 per cent. What have we to show for this additional expenditure of labor and material? Does it reflect a corresponding increase in the effective repair work performed? If so, was this additional repair work due to catching up on deferred maintenance or to an increase in the use of the equipment, or to both causes? Why should it require an increase of 25 per cent in the hours of labor to apply only 20 per cent more material? These are some of the questions that have to be answered before the study is complete.

The Measure of Repair Work Performed

Equipment repairs are ordinarily divided into heavy or classified repairs and light or running repairs. In the case of locomotive repairs, the heavy repairs are sub-divided into five classes in accordance with the amount of work performed. No satisfactory method has as yet been devised for weighting these different classes of repairs and reducing them to a common denominator. The most practical unit appears to be the cost of the material applied after proper equation for changes in the value of the dollar. While this unit of measure may not give proper weighting to the cost of running repairs which consist chiefly of labor, it gives more weight to that kind of repair work than the use of the number of run out miles restored or the number of classified repairs made which would apply only to the heavy repairs. As a matter of fact all of these units of measure have to be considered before the investigator can reach a determination as to the relative amount of repair work performed in the periods under consideration.

Cause of Difference in Amount of Repair Work Performed

Having reached a conclusion as to the relative amount of repair work performed in the periods under consideration the next point to determine is the cause for this difference in work performed. This may be due to changes in the requirements for repair work from a greater or less use of the equipment, to making up maintenance deferred from a previous period in addition to the current work, to a failure to keep up with current requirements or to a combination of all these causes.

The determination of the amount of deferred maintenance included in the repair costs is not ordinarily difficult and can be obtained from the records of bad order equipment on hand at the beginning and end of each period and the cost of reducing the excess number of bad order units during the period. This investigation may also develop the fact that the normal maintenance has not been performed during one or both of the periods under consideration and that there has been an increase in the number of unserviceable units on hand at the end of the period which will have to be repaired at a later date.

Having eliminated the effect of deferred maintenance from the expenses, the next step is to determine the requirements for repair work in each period as measured by the use made of the equipment.

Units for Measuring Use Made of Equipment

The customary unit for measuring use from the point of view of the requirements for repairs is the number of miles run by each unit. If the units in each class of equipment

were of like weight and required the same amount of repairs per mile run, the problem would be simple, but this unfortunately is not the case and the analyst is again confronted with the problem of devising a unit which will give proper weight to the additional expense of repairing the heavier units of equipment. The variations in cost per mile run due to weight are greatest in locomotive equipment and the measure of the use of locomotives from the point of view of repair requirements commonly accepted is the locomotive ton-mile. This is obtained by multiplying the miles run by each locomotive by its weight, the locomotive ton-miles for all locomotives being obtained by adding together the ton-miles for the individual locomotives. It is also desirable to divide the locomotive ton-miles and the cost of locomotive repairs between freight train service, passenger train service and switching and work service as the cost per locomotive ton-mile varies with each service and a change in the proportion of the locomotive ton-miles in these services would affect the requirements for repairs as measured by the total locomotive ton-miles.

In the case of freight and passenger cars, the additional weight of the car is not ordinarily an element of increased cost of repairs. In fact the heavier car usually stands up better in service and costs less to repair. The car-mile rather than the car ton-mile is therefore generally used as a measure of the requirements for repairs.

Car mileage figures for passenger train cars owned are generally readily available; it only being necessary to eliminate from the figures reported to the Interstate Commerce Commission the miles of Pullman cars when maintained by that company, and the miles of foreign passenger cars included in the statistics as reported, and to add the miles of owned passenger cars on foreign lines included in the published statistics of those lines. It is also desirable to compare separately the mileage and repair costs of dining cars, parlor cars, coaches and other passenger train cars.

Unfortunately in the case of freight cars, the miles run on foreign lines are not available and the only obtainable measure of repair requirements is the car year. The analysis of the freight car repair account also presents other difficulties due to the maintenance (or lack of it) of freight cars away from the home road, profit or loss from repairs made at M.C.B. prices and other peculiarities, which make this account in itself the proper subject for a separate article and can only be mentioned in passing.

The motor car miles, which are readily available, constitute the best measure for repair requirements of the motor equipment of cars. The repairs to the car itself are included in repairs to freight, passenger or work cars as may be appropriate from the service in which the motor car is used.

Repairs to floating equipment are of importance on only a few roads. Mileage records are not required by the Interstate Commerce Commission and are not generally kept by the roads as they would only be useful to a limited extent in analyzing repairs to the machinery. The repair costs should be separated between the different classes of equipment, such as ferry boats, tugs and barges and compared with the days in service and boat years of each class.

The total mileage of work equipment is reported but it is not segregated in the published records between the different classes of work equipment. There are so many dissimilar units in this group such as steam shovels, locomotive cranes, official cars, ballast cars, bunk cars, etc., that a study of the repair costs of the various classes of work equipment and the mileage made by each class is necessary for a complete analysis of the subject.

Summarizing the methods of analyzing fluctuations in equipment repair accounts as outlined above, we find that the following steps are necessary:

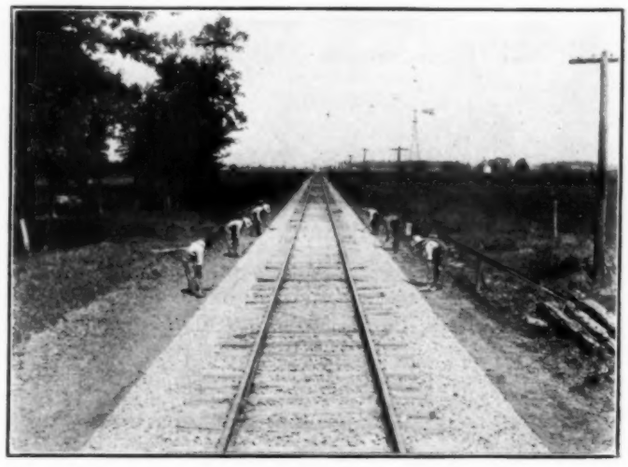
1. Separation of the fluctuations in expenses as between those due to changes in rates of pay of labor and prices of material and those due to changes in hours worked and material applied.
2. Elimination of deferred maintenance.
3. Comparison of the amount of repair work performed with the requirements for repairs as measured by the use made of the equipment to determine the relative efficiency of the men and the machines.

Analysis of Other Groups of Maintenance of Equipment Expenses

The other groups of Maintenance of Expenses do not present the intricate problem to the analyst that we have found in our study of the equipment repair accounts. The "Depreciation" accounts which constitute the largest part of the remaining expenses consist of charges determined by applying a percentage rate to the ledger value of the equipment. Any fluctuations in these accounts must therefore be due to changes in not more than two factors and can be readily analyzed. Fluctuations in the "Retirement" accounts depend chiefly upon the number of units retired, the accrued depreciation and the salvage values, all of which can be readily ascertained.

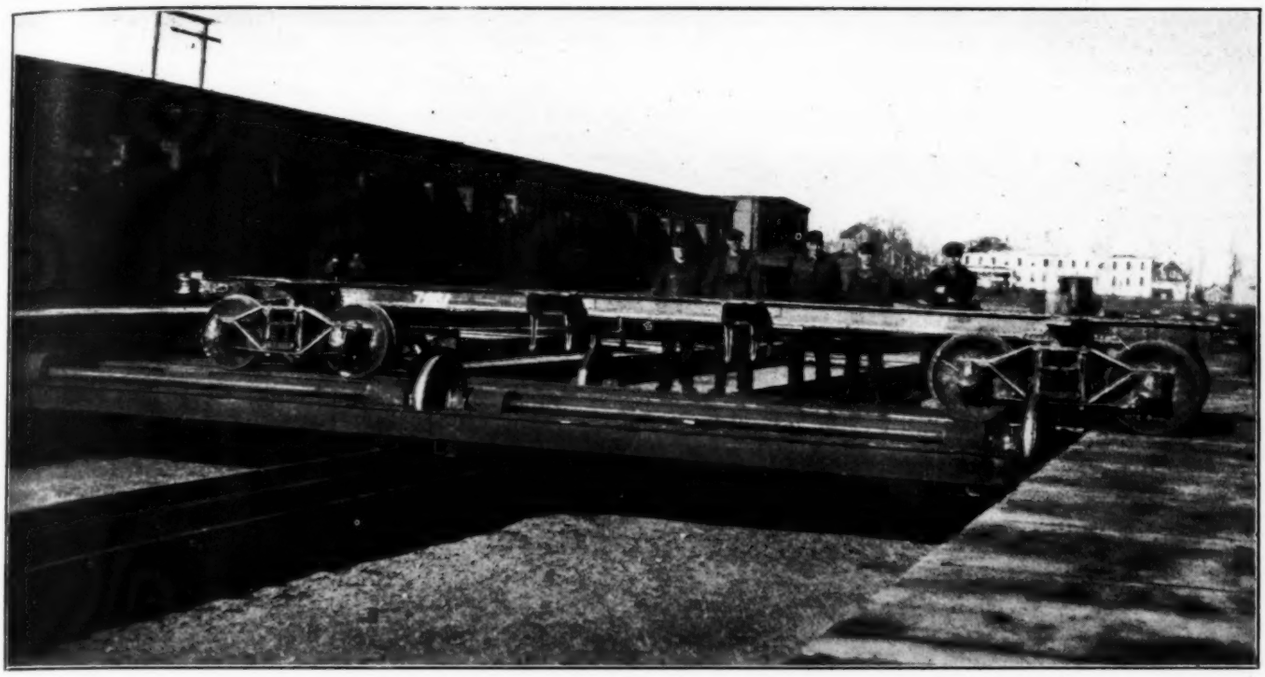
The remaining accounts under Maintenance of Equipment do not ordinarily require much attention in an analysis except in cases of unusual fluctuations such as occurred in "Other expenses" on account of the strike in 1922. Any unusual fluctuations should of course be the subject of special study of the items contained in the account in the periods under consideration.

In conclusion, the writer wishes to emphasize the necessary complexity of analyses of fluctuations in the equipment repair accounts. The wide variations in rates of pay and prices of material in recent years as well as the large amount of repair work that has been deferred from one period to another make it necessary to dissect the accounts completely before a proper analysis can be made. It would be a great aid to those making such analyses if index numbers or equation factors for rates of pay and prices of material were developed monthly by each railroad for the principal repair accounts in the same way that the equation factors were developed for the various years of federal control in the comparisons of the amounts expended by the Director General of Railroads for maintenance with the amounts expended by the railroads for that purpose during the test period. The compilation of such equation factors currently would not be burdensome and would permit a rapid survey of the general causes of the monthly fluctuations in Maintenance of Equipment expenses in advance of the intensive study outlined above.



Keystone

A Stretch of D. T. & I. Track After Reballasting

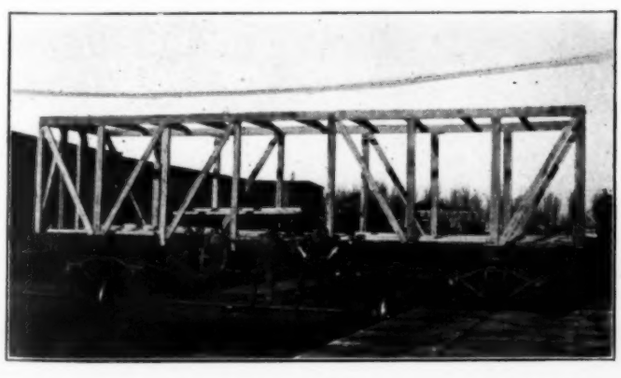


The Steel Underframe Was Built and the Trucks Assembled in 15 Man-Hours; Members of the Crew, from Left to Right are J. Foster, Everett Anderson, Lawson Dickson, Burns E. Grant and Clyde Barden, Foreman

Bangor & Aroostook Car Building Contest

Box Cars, Including Trucks, Completed by Two Crews in a Total Time of 94 Man-Hours Each

On December 3, 1923, a car building contest was started in the Bangor & Aroostook shops at Derby, Maine, between two of the best crews employed at the plant. The cars being built are of A.R.A. standard dimensions, with

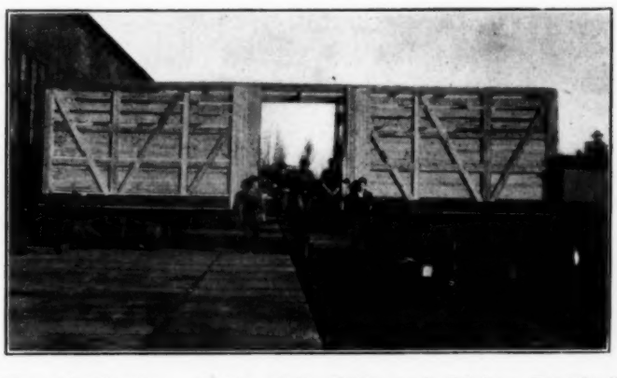


The Wood Frame and Floor Was Assembled in 28 Man-Hours

a steel center member construction of 32 sq. in. cross-sectional area, to which are attached four cast steel draft arms, two center plates riveted to the center member, four needle beams and two body bolsters, requiring the driving of a total of 344 rivets per car. Cardwell Type G-11-A draft gears with cast steel yokes were applied, using Type D couplers. The trucks are of the arch bar type, having steel bolsters, steel spring planks and 4½-in. by 8-in. journals.

The superstructures of the cars are of wood construction and the frame members are of Southern pine and oak. There are two 5-in. by 9-in. side sills, two 5½-in. by 7¾-in. center sills and four 3½-in. by 9-in. intermediate sills, 36 ft. long, fitted in 8-in. by 9-in. end sills. In each body frame, including the end and door posts, there are 20 posts, 16 braces, the side and end plates, 9 carlines and 2 lines of belt rail.

The side lining consists of ⅞-in. by 3¼-in. hard pine



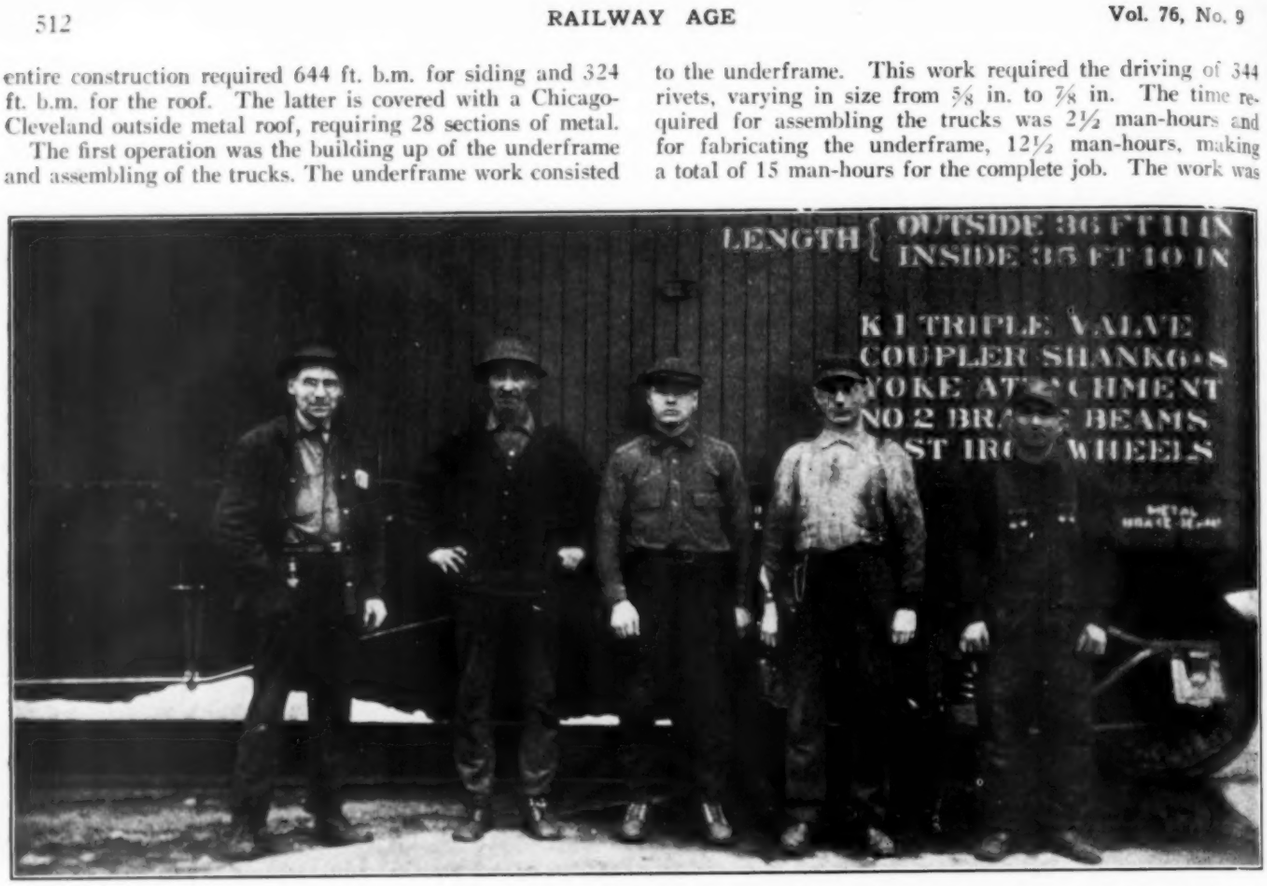
The Application of the Belt Rails and Lining Required 14 Man-Hours

sheathing, while the end lining, which extends to the end plate, is of 1¾-in. shiplap spruce flooring, the same material being used for the floor. The sheathing used is 13/16-in. by 3¼-in. material, both for the sides and the roof. The

entire construction required 644 ft. b.m. for siding and 324 ft. b.m. for the roof. The latter is covered with a Chicago-Cleveland outside metal roof, requiring 28 sections of metal.

The first operation was the building up of the underframe and assembling of the trucks. The underframe work consisted of the attachment of the draft arms, the body bolsters, the needle beams and needle beam brackets, the brake cylinder bracket and the center plates to the center sills. The draft gear, yokes and couplers were also assembled and applied to the underframe. This work required the driving of 344 rivets, varying in size from 5/8 in. to 7/8 in. The time required for assembling the trucks was 2½ man-hours and for fabricating the underframe, 12½ man-hours, making a total of 15 man-hours for the complete job. The work was done by a gang of one foreman and four men, who are shown with the completed underframe and trucks in one of the illustrations.

The building of the superstructure included the applica-



This Crew Built the Superstructure of Car No. 60677 in 73 Man-Hours—Left to Right: E. W. Bailey, Foreman; Murrell Harris, Alphonse Michaud, Charles E. Buswell and John Morrill

These Men Also Completed Their Superstructure in 73 Man-Hours—Left to Right: C. B. Godsoe, Foreman; Walter Chappell, S. Sherman Davis, Louis Cyr and Levi Robichaud

tion of the wood sills, the body frame members, the inside lining, the sheathing and the roof, and was in the hands of another gang of one foreman and four men. The operations, however, were divided into three groups. The first consisted of assembling the sills, applying the flooring and erecting the body frame complete. This work required a total of 28 man-hours.

The next group of operations was made up of the application of the belt rails and the inside lining, leaving the car ready for the application of the sheathing and roof. These operations required a total of 14 man-hours.

Then followed the application of the sheathing and roof

B. & A. Car No. 60677 Was Built Complete, Including Paint and Stenciling, in 94 Man-Hours

and the painting of the car, ready for stenciling. The woodwork was completed by the car men in 31 man-hours. Added to this was 1 hr. 50 min. for the air brake work and 2 hr. 40 min. for painting, making a total of 35½ man-hours, for this group of operations.

Two superstructure crews were entered in the contest. The completed car for which the detail records are given, is shown in one of the illustrations. The complete time, including 1½ man-hours for stenciling, was 84 man-hours. A summary of the time required for the different groups of operations is as follows:

	Man-hours
Assembling trucks	2½
Fabricating the underframe	12½
Applying the sills, body frame and floor	28
Applying the belt rails and lining	14
Applying the sheathing and roof, and painting	35½
Stenciling	1½
Total time to complete the car	94

The second gang, which built car No. 60672, completed its superstructure in 79 man-hours, including the painting and stenciling, or in 73 man-hours, exclusive of these items and the air brake work—the same total time as that required by the gang working on No. 60677. The two cars required the driving of 6,308 nails, and the application of 360 bolts of various sizes.

These two cars were taken from a series of 200 which were being built at the Derby shops. For their construction no special preparations or changes in methods of handling the material were made. All material was delivered to the tracks on which the different stages of the work were performed, and the man-hours recorded do not include the time of the laborers who delivered the material.

No special provisions were made for additional or extra facilities in completing this work. The trucks and underframe were assembled on one track and the superstructure completed on another, which was provided with a scaffold on each side at such height that workmen could take care of the top part of the superstructure without horses or other moveable staging.

The crew assembling the trucks and underframes was provided with an oil rivet heater and air hammers; the crews working on the superstructures were provided with air boring machines. Aside from these tools, no other machinery was used. Cars were spray painted and hand stenciled.

The shop in which these cars were constructed has a cement floor and all cars had to be moved from one track to another by transfer table. From the time the trucks were started, the cars were placed on three different tracks before being completed. The time required for these movements is not included in the record since none of the men employed in building the cars have any part in handling them to or from the transfer table.

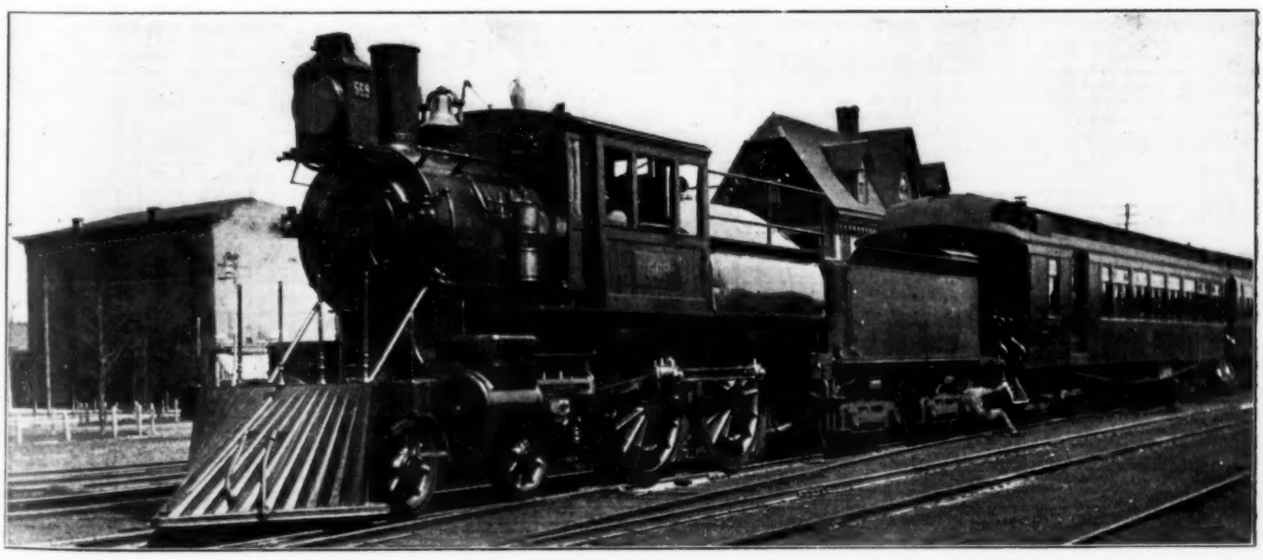


Photo by Ewing Galloway

A Baltimore & Ohio Express at Bound Brook, N. J., in the '80's

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended February 16 continued to break all previous records for this season of the year. The total, 935,109 cars, represents an increase of 118,000 cars as compared with the corresponding week of last year and an increase of 162,000 cars as compared with the year before. As compared with last year increases were shown in the loading of all classes of commodities except coke and as compared with the year before there were increases in all classes except grain and grain products. Loading of forest products set a new record. The summary of the report compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING

Week Ended Saturday, February 16, 1924

Districts	1924	1923	1922
Eastern	225,561	195,140	187,335
Allegheny	194,149	180,571	157,923
Pocahontas	44,551	31,807	34,651
Southern	147,972	136,014	120,372
Northwestern	122,146	89,549	97,292
Central Western	139,485	130,348	123,655
Southwestern	61,245	53,217	52,047
Total Western Districts	322,876	273,114	272,994
Commodities			
Grain and grain products	53,313	38,474	54,863
Live stock	33,839	29,430	30,040
Coal	194,295	183,241	188,783
Coke	13,031	15,115	7,566
Forest products	82,718	58,658	50,197
Ore	9,795	9,014	4,147
Mdse. L. C. L.	240,340	208,808	218,686
Miscellaneous	307,778	273,906	218,993
Total	935,109	816,646	773,275
February 9	906,489	849,352	777,791
February 2	929,936	865,414	747,895
January 26	891,326	869,464	740,386
January 19	895,276	864,297	731,109
Cumulative loading to date	6,133,670	5,905,377	5,083,980

For the week ended on February 7 there were 138,017 surplus freight cars available for service, a decrease of 31,019 as compared with the number on January 31. Surplus box cars numbered 59,297, a decrease of 15,118, while there also was a decrease within the same period of 13,820 in the number of surplus coal cars, which brought the total for that class of equipment to 53,758. The reported shortage on February 7 totaled 6,998, an increase of 2,400 compared with the total on January 31.

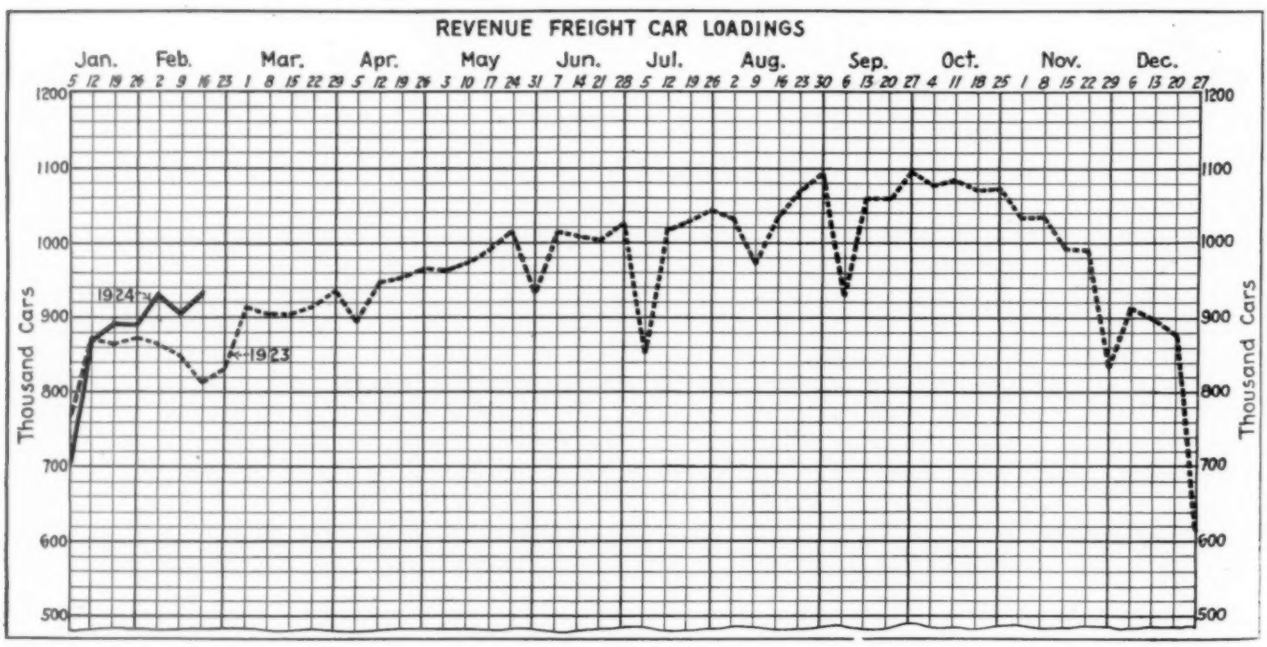
The railroads on February 1 had 25,390 freight cars on order while 16,192 freight cars were placed in service during the month of January. Freight cars on order on February 1 included 8,128 box cars, 7,663 coal cars and 5,244 refrigerator cars. The roads also had on order on that date 2,553 stock cars and 1,178 flat cars. Of the cars placed in service during the month of January, box cars numbered 8,241, coal cars 5,347 and refrigerator cars 636. The railroads also placed in service during the month of January 271 locomotives while on February 1 they had on order 439 locomotives with deliveries being made daily.

Car Loading in Canada

During the week ended February 16 a total of 53,077 cars of revenue freight were loaded at stations in Canada which was an increase of 1,471 cars over the preceding week and an increase of 13,505 cars over the corresponding week last year, loadings in eastern Canada accounting for 8,074 of this increase and in western Canada for 5,431 cars. Grain loading fell off slightly in the week ended February 16, but only in the East, and coal and pulpwood showed increases in both East and West.

Cars of revenue freight loaded in eastern Canada in the week ended February 16 and for the previous week are as follows, by commodities, respectively: Grain and grain products, 2,438 and 2,927; livestock, 1,068 and 1,043; coal, 1,171 and 637; coke, 319 and 208; lumber, 2,423 and 2,441; pulpwood, 3,921 and 3,706; pulp and paper, 2,177 and 1,953; other forest products, 1,734 and 1,829; ore, 653 and 703; merchandise l.c.l., 10,005 and 9,950; miscellaneous, 9,683 and 9,017; total cars loaded, 35,592 and 34,414; total cars received from connections, 34,514 and 30,684; total cars loaded for the corresponding weeks in 1923 were 27,518 and 31,316.

Cars of revenue freight loaded in western Canada, by commodities, for the week ended February 16 and the preceding week, are as follows, respectively: Grain and grain products, 6,449 and 6,193; livestock, 926 and 1,046; coal, 2,032 and 1,982; coke, 49 and 56; lumber, 854 and 708; pulpwood, 510 and 466; pulp and paper, 266 and 285; other forest products, 1,471 and 1,743; ore, 324 and 282; merchandise l.c.l., 3,093 and 2,789; miscellaneous, 1,511 and 1,642; total cars loaded, 17,485 and 17,192; total cars received from connections, 2,848 and 2,983; total cars loaded for corresponding weeks in 1923, 12,054 and 13,605.



The Human Side of the Foreman's Job

Talks on Supervision Methods by Three Foremen of Billerica Shops of Boston & Maine

THE FOREMEN'S ASSOCIATION at the Billerica shops of the Boston & Maine is a voluntary organization for educational purposes. It devoted its monthly meeting in February to a discussion of principles and methods in the supervision of men. Abstracts of the talks given on that occasion by three of the general foremen, based upon their practical experience, follows:

BY JOSEPH GULLAGE

General Foreman, Car Shops

The busiest and hardest working man in railroad shops today is the foreman, providing he is on to his job. These positions demand, in the first place, knowledge of what work should be done, how it can best be performed under the existing conditions and when it has been sufficiently and satisfactorily completed to meet requirements.

What is of more importance, a foreman must know how to get along with and how to handle his men. He must also maintain a certain dignity without conveying the impression that he is without feeling and sympathy for the men working under his direction. He is the one who comes in direct and constant personal touch with his men; therefore he is the man that personally represents the management with the men. He should be fair in all his dealings. should have no favorites nor show any partiality. A foreman has to act as a judge every day; therefore he should be just. The foreman should be exact in his promises and should always try to keep them.

The foreman should not waste anger. Use it. Anger is valuable and should not be used carelessly. A foreman should keep his most forceful language for special occasions. He should not use snap judgment in settling a dispute, always hear the other side, never blame a man until he is given a chance to give his side of the story. Don't hold spite. Be quick to forgive. Whenever you have to scold a man, go to him later and show him his faults in a friendly way. Never show discouragement. Never let yourself be beaten.

Foremen must always have perseverance and the "never say die" spirit. Always notice the good points in your men as well as the bad. Let the men see that you can appreciate as well as condemn. Watch for special abilities in your men. Place each man where he can do the most work. Always take your full share of the blame. The foreman who can share both blame and praise with his men has discovered the secret of success in managing men.

Try to prevent accidents. Educate or eliminate the careless man. A good foreman is known by his men. Don't feel too big for your position, for you cannot tell but the man under you may be able to fill your position as good or maybe better if given the opportunity.

The day in which a man's value as a foreman was measured by his ability to force men to perform a greater amount of work in a day than they otherwise would have done is past. The need is not so much for drivers as it is for leaders of men today.

Don't let your men loaf around the shop. Whenever you see any of your men standing around talking to other men go right up to them and see if there is anything that can be done to keep them at work. Find out what they are waiting for and get them back on the job just as quickly as possible.

The foreman is the connecting link between the management and the men. He is the key man and the top sergeant who receives the policies and orders from his superior, passes them along to the men under his direction. It is his job to convert plans into production. To do this he must know how to handle men. He must understand the company's policy and he must be able to pass it on to his men in a manner that they will understand; in other words, he must be a leader of men. He must have executive ability.

No man can attain leadership without paying the price for it. He must be willing to study. The present-day foreman cannot employ the old driving tactics and hope for much success in his efforts. Too often the foreman promoted from the ranks has become overbearing and hardened in his treatment of his men. If the foreman is cheerful, loyal and efficient the men under him naturally tend to become that way, also.

The foreman who is unfair or a tyrant will do more damage to an organization in a day than his influence and production can do in a year. The successful foreman of today must be a human engineer and must be able to get confidence and goodwill. He must understand that his job is to try to educate the men under him. Education therefore must begin with the foreman, from him it should reach the men. The outstanding need in the railroad shop today is the foreman who not only knows what is to be done and how to do it but who also knows how to convey that knowledge quickly and surely to the men under him. All men cannot be handled alike. Some have got to be practically forced to do service but the majority I find can be made to accomplish more by a kind word of encouragement from time to time.

BY CHARLES H. NUTTER

Foreman, Blacksmith Shop

A more systematic method should be used to instruct the foreman so that he can and will make the man under him feel that the officials have the interests of the individual at heart and that, no matter what happens, he will get a square deal.

The personality of the foreman should be such that he will be approached by his men with their confidences, both as to happenings inside and outside the shops, and asked for advice. When this is done, the foreman will soon see that he has an organization that is *for him,* and when they are *for him* it means that they are *for the company* as a whole. He can instill such a feeling into the men that should reverses of any nature come to the railroad they do not say first of all that the officials are to blame, but are still *for a square deal* for all.

A foreman should at all times do unto others as he would like to be done by—this also applies to the officials. The days of driving have gone and men have got to be handled in an individual way, as the dispositions of no two men are alike. It is up to the foreman to find out the peculiarities of each of his men and handle them accordingly. This can be done where there is supervision enough, so that a man will not supervise more than 25 men. With more men he has not enough time, either properly to instruct them in their duties or to get to the man's personal makeup in such a way that he can make a booster of that man.

Every employee has the makings of a good man who would fit in somewhere in some department if someone could find the way of turning on the necessary spark. No one

can find this more quickly than the foreman who comes in contact with him at all hours of the day.

There has always been too much of the old school method of continually looking for a chance to get something on the foreman or man (who has, in the first place, not received the training he should have) so that he can be bawled out, with a threat of being discharged, instead of helping the foreman and man involved, to profit by the mistakes so that he will feel like saying: "I have got to hit the ball in such a way that these things will not occur again." A discouraged foreman or man cannot give satisfactory service, and when either the man feels that he cannot go to his foreman or the foreman feels that he cannot go to his superior and frankly talk over truthfully any occurrence, whether a mistake or not, without being bawled out or threatened with dismissal, he is going to try to cover it up in some way. This treatment should be discouraged and a spirit of confidence instilled in all so that they will be hitting the ball from all angles.

More attention should be given to training all the foremen in all the problems of the railroad, as it is through them that the men will be enlightened on happenings and matters that should be carried by them to the public at large, whose good will we have to cater to at all times. A satisfied supervisor means many satisfied men, and a satisfied supervisor can only be had by studying his particular problems and his disposition and makeup and trying to help him, instead of helping to increase his dissatisfaction to the point where he becomes discouraged.

It all sums up that some method should be devised whereby proper training can be given the foreman, so that he can carry out the policies of the railroad, as they should and can be carried out through him. We have the necessary brains in all departments to make this a 100 per cent organization of boosters, with the necessary proper training.

By Chauncey L. Mitchell

Foreman, Machine Shop

When I think of what my attitude towards the men working under me should be, I find myself looking back to the time when I was being instructed in the work of railroading at the old Boston shop, some 27 years ago. The men who were finding fault all of the time and were impatient with our shortcomings brought out the worst in us; and naturally, working under unfavorable conditions, we failed to give them our best work. Men cannot do their best under such leadership. But those who were calm and sympathetic and ready to help us correct our mistakes gained our confidence, and we worked for them with interest and zest.

This does not mean that a foreman has to be hail-fellow well-met with his men, but he must inspire them with confidence, have infinite patience, and bear in mind at all times that the best men make mistakes sometimes. A man should be human and bear in mind that oftentimes home conditions, such as sickness, financial difficulties and misunderstandings, make a good man temporarily unfit.

If a man makes a mistake, don't jump on him before you find out where the fault lies. It may be that he did not know how to do the work and therefore the fault was yours for not instructing him before he started; or perhaps you have been impatient with him so that he did not like to ask you how to do the job.

Never go round with a grouch on, so that the men under you hesitate to go to you at all times for information concerning their work. Do not continually find fault with your men's work, but let them always feel that just as long as they do their best you are satisfied.

I always like to have plenty of work ahead of a man, so that he always knows what his next job is going to be; also to have two or more men doing the same class of work, as it creates rivalry, a spirit of competition which keeps things moving.

I sometimes ask a man to keep track of the time it takes to do a certain piece of work. He may stop you to tell you that it took him one hour and fifteen minutes; but that he believes he can do it the next time in one hour; and even better after that. At the same time I make some suggestion as to jig or some other device that could be made to facilitate matters, and get him to think it over and see if he can find some way to do it more quickly. In this way you have gotten him interested in his work, and you will find that he is producing more work and that his efforts are having an effect on men about him. If the men get thoroughly interested in their work, results are bound to be good. Make them feel that they are a part of the railroad.

If a man does not co-operate in this spirit and fails to produce the work so that you have to go over the same ground with him daily, he is either not suited to the kind of job he is on, or is hopeless, and the sooner he is transferred or dropped the better for him and for the company.

Be firm and just, but always sympathetic.

The C. N. R. Continental Limited in British Columbia

General News Department

The shops of the Wabash Railway at Decatur, Ill., were damaged by fire on February 26, four buildings being practically destroyed; estimated loss $250,000.

February 28 was the ninety-seventh birthday anniversary of the Baltimore & Ohio. On this date, in 1827, the Maryland state legislature granted the company its charter.

The National Safety Council (168 North Michigan avenue, Chicago) will hold its next annual conference in Louisville, Ky., beginning on Monday, September 29, and continuing five days.

The Interstate Commerce Commission has granted a petition of the Gulf & Ship Island for a modification of its train control order of January 14, 1924, exempting the road from complying with it.

Motor passenger cars are now in use on 157 railroads in this country, according to a compilation made by the National Automobile Chamber of Commerce; about four times as many roads as were shown on a list made one year ago.

Members of the Signal Section of the American Railway Association, and others, planning to attend the meeting of this Section in Chicago March 13 and 14, are reminded that the exhibition in the Coliseum is to be open all day on Monday, Tuesday and Wednesday, but on Thursday only until 1 P. M.

The annual dinner of the American Railway Engineering Association at Congress Hotel, Chicago, on Wednesday evening, March 12, will have for speakers Sir Henry Thornton, president of the Canadian National Railways; Fred W. Sargent, vice-president of the Chicago & North Western, and James Schermerhorn, humorist and former editor of the Detroit Times. A number of novel features are being planned for the dinner. Applications for reservations should be made to E. H. Fritch, 431 South Dearborn street, Chicago.

Improved C N. R. Earnings

Operations of the Canadian National Railways for the month of January showed a net improvement of $1,088,159 over the same month last year. There was an operating net of $491,421 in January this year as compared with an operating deficit of $596,738 for the same month last year. Gross earnings decreased by 2.3 per cent., while operating expenses decreased by 7.9 per cent.

Michigan Central Seeking Permission to Permit Use of Detroit River Tunnels by Another Road

Formal notices have appeared in the local press of St. Thomas, Ont., divisional headquarters of the Canada Southern division of the Michigan Central, of applications being made to the Canadian Parliament by the Michigan Central and the Detroit River Tunnel Company for the right to lease or transfer the lines to some other road.

Canadian National Considering B. & O. Shop Plan

A modified form of the Baltimore & Ohio plan, whereby shop employees co-operate with the management in securing greater efficiency, is likely to be soon given a trial on the Canadian National. Although no decision has yet been reached and the board of directors has not yet had an opportunity of studying the subject, some statements made in Winnipeg last week by Sir Henry Thornton, president of the C. N. R., indicate a trend in that direction.

It had been stated the day previous in a press despatch from Winnipeg that the Baltimore & Ohio plan would be introduced on the Canadian National in the near future, but on the day following Sir Henry denied this report. He added, however: "It is true that there is under consideration and discussion a scheme for co-operative shop working, but this scheme relates to shop practice and working conditions, and has for its object the mutual welfare of both the men and the company. There is no intention on the part of the Canadian National Railway System to part with any of the executive functions which are regarded as essential to the well-being of the property."

Coal for Forty-four Days

The railroads, after accumulating coal steadily during 1923, had on hand on January 1, 1924, approximately 19,000,000 net tons, according to the report of a survey of commercial stocks of coal prepared jointly by the Bureau of the Census and the Geological Survey. This was the largest quantity of railroad fuel in storage ever recorded, the report says, excepting only the stocks on April 1, 1922, when the railroads had stored about 19,800,000 tons in anticipation of the strike. The supply on January 1, which includes coal in stockpiles, cars and chutes, was sufficient to last 44 days.

Little Progress Toward Railroad Legislation

Efforts to make political capital out of the scandal over the government's oil leases continue to absorb much of the attention of members of Congress who had been planning legislative attacks on the railroads and very little progress is being made in Washington on railroad legislation. In the House, where the tax bill has been the order of business, there has been no activity relating to the railroads, while the Senate committee on interstate commerce is continuing at the rate of an hour or so a day its hearing on Senator Gooding's bill to amend the fourth section of the commerce law.

After a number of witnesses from the intermountain country had been heard in support of the bill and vigorous condemnation of the railroads' rate-making policy in the past and of their present applications to the Interstate Commerce Commission for fourth section relief to enable them to meet water competition without reducing the intermediate rates, the committee heard Chairman Hall of the commission for a short time on February 27. Commissioner Campbell had previously testified as to his individual opinions, which are at variance with those of a majority of the commission, and after some criticism because the majority views of the commission had not been sought had been brought to the attention of the committee, it requested Mr. Hall to appear. He did not attempt to express the view of the commission as to the merits of the bill, saying the commission had not been asked for them, but he began a lengthy outline of its attitude as expressed in its various decisions. L. J. Spence, director of traffic of the Southern Pacific, then began the testimony of the railroads in opposition to the bill. He said that the discrimination of which the intermountain interests complain would exist even if the railroads did not attempt to meet water competition because the communities on the water would have the benefit of the lower water rates.

Representative Cleary has introduced a resolution, H. J. Res. 198, to authorize the President to pay just and meritorious claims for loss of and/or damage to freight in transportation arising during federal control and declaring the intent of section 206a of the transportation act in relation to the provision thereof authorizing actions at law against an agent appointed by the President. A similar resolution was also introduced by Representative Dyer. Senator Jones has introduced a bill, S. 2589, providing for a reduction in transportation rates for veterans and parents of deceased veterans. Several additional bills have been introduced to prohibit a Pullman surcharge.

Operating Statistics of Large Steam Roads—Selected Items for the Month of December, 1923

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1923	394	290,488	311,213	33,103	5,363	65.5	286,508	113,146	119	26	17.9	...
	1922	394	316,909	339,326	35,748	5,414	69.1	287,364	122,089	115	27	18.9	...
Boston & Maine	1923	2,455	564,294	619,951	55,049	12,046	67.7	635,074	259,579	349	127	26.8	30
	1922	2,455	623,306	693,056	62,863	12,511	73.1	631,910	270,605	313	132	29.7	2
N. Y., New H. & Hartf.	1923	1,974	496,029	524,174	34,905	11,951	68.7	615,768	259,622	293	78	21.1	6
	1922	1,974	451,063	485,619	32,451	10,311	72.6	521,081	228,913	284	96	25.3	...
Great Lakes Region:													
Delaware & Hudson	1923	887	387,553	549,042	53,533	10,191	61.7	682,955	339,032	258	41	13.6	45
	1922	886	363,601	515,808	40,685	8,832	65.0	583,747	299,037	251	47	15.8	51
Del., Lack. & Western	1923	993	584,028	722,157	112,750	17,150	64.1	994,775	437,959	285	72	20.1	3
	1922	994	506,843	617,963	110,390	13,836	64.9	823,381	385,993	280	103	26.8	3
Erie (inc. Chi. & Erie)	1923	2,309	994,765	1,128,142	81,163	34,143	65.2	2,076,742	949,316	663	129	16.2	193
	1922	2,309	1,167,798	1,338,074	47,662	38,580	70.7	2,276,992	1,117,972	521	240	31.5	...
Lehigh Valley	1923	1,317	648,232	716,182	87,838	17,443	61.7	1,085,688	499,757	427	98	18.7	28
	1922	1,317	477,638	542,949	63,280	12,537	71.3	752,633	390,797	301	252	45.5	1
Michigan Central	1923	1,827	580,360	596,289	21,162	17,965	63.5	968,417	373,152	320	55	14.6	75
	1922	1,827	612,197	630,295	26,813	18,326	67.0	1,001,069	426,047	291	94	24.4	13
New York Central	1923	6,469	2,188,638	2,473,050	172,402	73,592	59.4	4,568,864	1,935,753	1,294	376	22.5	344
	1922	6,468	2,621,089	3,033,051	235,522	84,418	62.5	5,230,482	2,416,357	1,160	586	33.6	4
New York, Chic. & St. L.	1923	1,670	771,779	781,592	3,324	19,892	64.0	1,107,689	444,169	221	68	23.4	9
	1922	1,670	770,638	784,597	5,368	18,979	70.4	1,023,985	446,764	217	78	26.5	8
Pere Marquette	1923	2,197	390,406	405,442	8,471	9,317	64.0	533,829	241,070	192	28	12.6	13
	1922	2,182	365,064	375,932	6,832	9,014	72.8	484,164	237,233	158	54	25.5	...
Pitts. & Lake Erie	1923	231	129,052	139,813	1,351	4,353	60.2	336,760	193,526	72	15	17.0	16
	1922	231	174,141	181,061	1,395	5,758	63.6	425,129	248,924	60	14	19.1	...
Wabash	1923	2,418	696,524	739,660	11,443	18,459	66.9	1,026,578	423,872	289	49	14.4	1
	1922	2,418	545,737	582,552	8,122	15,980	76.8	811,494	369,295	247	92	27.1	...
Ohio-Indiana-Allegheny Region:													
Baltimore & Ohio	1923	5,212	1,830,367	2,096,344	177,734	47,730	60.7	3,037,318	1,429,021	1,118	203	15.4	239
	1922	5,235	2,119,987	2,458,578	146,884	55,876	66.5	3,444,458	1,754,996	1,006	290	22.4	26
Central of New Jersey	1923	694	280,798	309,298	38,334	6,636	60.8	434,237	209,173	232	47	16.7	26
	1922	695	308,984	336,490	39,732	6,512	61.1	434,089	217,424	200	71	26.2	...
Chicago & Eastern Ill.	1923	945	250,189	252,676	3,818	5,908	59.6	375,807	181,539	124	50	28.8	28
	1922	945	266,855	276,910	4,579	6,420	64.2	406,045	211,355	103	73	41.7	2
Cleve., Cin., Chic. & St. L.	1923	2,377	689,455	725,340	7,185	19,674	60.0	1,280,402	602,993	351	96	21.4	51
	1922	2,377	732,052	761,736	6,826	21,416	68.2	1,302,795	653,927	288	147	33.8	...
Elgin, Joliet & Eastern[2]	1923	460	116,262	129,331	8,435	3,534	64.6	273,505	146,389	96	17	15.2	18
	1922	459	143,648	160,596	11,707	4,108	65.6	323,516	178,038	79	19	19.4	...
Long Island	1923	393	44,736	52,134	8,732	576	57.8	34,960	13,342	39	11	22.7	...
	1922	393	47,706	61,757	9,424	595	60.3	35,614	14,372	41	13	23.9	...
Pennsylvania System	1923	10,906	4,493,350	4,881,193	344,964	116,224	62.9	7,788,392	3,759,011	2,898	616	17.5	380
	1922	10,902	4,625,260	5,143,363	456,076	114,715	65.2	7,611,373	3,887,571	2,458	818	25.0	...
Philadelphia & Reading	1923	1,117	667,804	742,598	77,661	15,799	60.6	1,076,827	549,818	338	111	24.7	46
	1922	1,118	776,656	850,740	110,380	18,913	66.8	1,254,159	679,576	337	78	18.7	8
Pocahontas Region:													
Chesapeake & Ohio	1923	2,553	967,169	1,069,489	30,364	25,730	54.2	1,964,960	1,063,955	425	107	20.1	26
	1922	2,551	792,299	869,217	18,241	24,008	65.1	1,756,956	983,734	394	123	23.8	4
Norfolk & Western	1923	2,230	800,386	988,719	28,271	22,231	58.6	1,761,989	923,874	558	125	18.3	88
	1922	2,228	787,884	1,012,656	39,559	19,535	61.8	1,529,053	838,363	534	165	23.6	35
Southern Region:													
Atlantic Coast Line	1923	4,868	791,372	796,481	13,168	18,232	60.5	980,038	366,116	367	64	14.8	18
	1922	4,860	754,260	757,922	13,249	17,515	62.9	935,123	366,871	292	90	23.5	...
Central of Georgia	1923	1,907	290,341	290,983	5,534	5,645	66.3	308,947	132,296	123	21	14.9	3
	1922	1,907	275,253	279,285	5,065	5,525	72.4	293,249	137,431	113	15	11.4	...
I. C. (inc. Y. & M. V.)	1923	6,196	1,821,255	1,838,591	39,221	46,364	59.1	3,036,216	1,322,882	774	122	13.6	5
	1922	6,135	2,092,216	2,107,999	42,867	54,963	67.0	3,373,131	1,621,033	719	97	11.9	4
Louisville & Nashville	1923	5,026	1,617,171	1,712,289	61,279	27,335	59.4	1,810,515	845,950	628	91	12.6	4
	1922	5,022	1,579,104	1,700,794	61,513	27,339	64.5	1,720,042	848,023	571	141	19.8	...
Seaboard Air Line	1923	3,553	541,625	551,123	8,484	11,532	60.7	664,008	247,677	211	48	18.4	...
	1922	3,550	534,376	546,831	10,157	11,155	66.1	620,002	259,394	191	81	29.7	...
Southern Ry.	1923	6,942	1,423,864	1,454,912	29,835	31,097	63.5	1,701,673	691,918	845	134	13.7	4
	1922	6,942	1,569,762	1,616,079	43,261	33,455	68.8	1,812,715	807,037	849	200	19.1	1
Northwestern Region:													
Chic. & North Western	1923	8,463	1,530,947	1,601,584	19,167	33,210	61.1	1,981,753	807,519	879	198	18.4	92
	1922	8,386	1,708,213	1,759,949	27,754	33,595	63.0	1,995,431	894,450	785	269	25.5	...
Chic., Milw. & St. Paul	1923	10,987	1,645,376	1,694,073	64,803	40,837	65.6	2,320,742	1,047,893	964	176	15.4	107
	1922	11,022	1,870,184	1,930,676	78,626	43,422	65.2	2,542,419	1,197,987	851	212	20.0	12
Chic., St. P., Minn. & Om.	1923	1,726	318,577	339,725	14,615	5,772	65.1	322,252	132,849	170	40	18.9	7
	1922	1,726	331,129	350,434	15,409	5,538	64.6	319,531	136,048	149	60	28.8	3
Great Northern	1923	8,251	777,103	810,177	47,577	21,325	70.4	1,197,951	557,912	621	128	17.0	106
	1922	8,256	1,015,609	1,052,674	55,059	23,082	65.4	1,385,959	658,936	544	218	28.7	8
M., St. P. & S. Ste. M.	1923	4,374	465,308	474,081	8,017	10,603	69.6	544,650	246,616	291	52	15.2	20
	1922	4,352	668,880	681,100	12,025	13,095	66.8	722,670	349,173	283	66	19.0	2
Northern Pacific	1923	6,415	755,390	785,994	41,852	21,247	72.2	1,186,535	556,568	571	166	22.5	76
	1922	6,389	1,017,180	1,065,275	59,044	22,656	62.0	1,404,438	639,935	565	163	22.4	27
Oreg.-Wash. R. R. & Nav.	1923	2,180	191,174	200,362	18,133	4,621	72.6	261,555	123,439	139	25	15.2	14
	1922	2,143	230,086	259,573	39,123	5,011	69.0	293,415	137,467	127	39	23.7	...
Central Western Region:													
Atch., Top. & S. Fe	1923	9,855	1,603,717	1,704,953	83,065	43,825	61.9	2,548,092	897,412	789	171	17.8	123
	1922	9,807	1,936,027	2,024,175	94,346	49,448	63.9	2,853,716	1,088,167	721	222	23.5	14
Chicago & Alton	1923	1,010	310,278	315,998	4,798	6,854	58.8	430,926	185,318	129	25	16.3	26
	1922	1,010	352,228	358,761	7,401	7,595	65.9	457,730	215,382	109	44	28.5	1
Chic., Burl. & Quincy	1923	9,338	1,596,189	1,657,066	72,660	41,130	61.8	2,504,030	1,142,810	799	222	21.7	26
	1922	9,326	1,794,202	1,879,259	94,554	44,846	62.9	2,808,098	1,353,843	777	224	22.4	7
Chic., Rock I. & Pacific	1923	7,635	1,443,490	1,481,064	22,112	29,922	61.0	1,729,853	689,143	546	218	18.5	28
	1922	7,635	1,333,409	1,358,179	17,176	27,248	69.1	1,472,678	655,754	516	198	27.7	11
Denver & R. G. Wn.	1923	2,593	255,959	316,938	57,807	5,423	66.4	322,714	152,267	229	91	28.4	37
	1922	2,593	292,983	357,262	69,943	5,665	64.1	348,467	162,507	236	114	32.6	1
Oregon Short Line	1923	2,367	350,284	365,286	24,513	8,000	67.5	483,740	223,530	205	31	13.1	47
	1922	2,367	434,053	461,230	35,378	8,931	61.4	583,470	270,820	173	54	23.9	4
Southern Pac. (Pac. Sys.)	1923	6,945	1,300,763	1,455,610	260,835	34,508	60.9	2,095,770	798,395	620	160	20.5	13
	1922	6,924	1,190,305	1,354,054	226,605	33,373	64.8	1,922,239	778,934	599	208	25.7	4
Union Pacific	1923	3,712	957,721	982,607	61,419	30,466	70.4	1,663,954	694,579	479	71	13.0	162
	1922	3,709	1,419,418	1,452,063	75,170	32,974	64.4	1,957,380	845,770	423	143	25.3	21
Southwestern Region:													
Gulf, Colo. & Santa Fe	1923	1,897	240,432	249,576	6,246	6,414	64.0	368,502	154,744	127	31	19.4	10
	1922	1,897	272,823	279,802	7,181	6,823	64.7	395,811	176,105	107	38	26.1	2
Missouri-Kansas-Texas	1923	1,801	251,173	251,587	5,975	7,477	58.5	437,034	167,036	157	44	21.7	75
	1922	1,987	300,643	301,877	6,224	7,694	65.8	430,477	183,184	103	94	47.9	4
Mo.-Kans.-Tex. of Texas	1923	1,389	187,069	192,188	3,893	4,220	58.8	244,756	89,852	96	27	22.0	20
	1922	1,739	211,404	216,206	2,742	4,092	65.6	228,953	94,143	71	75	51.5	3
Missouri Pacific	1923	7,305	1,158,254	1,166,876	37,014	28,171	63.4	1,645,250	712,229	419	196	31.8	...
	1922	7,112	979,973	988,035	35,182	22,369	71.7	1,248,230	588,659	363	219	37.7	...
St. Louis-San Francisco	1923	4,683	814,951	828,823	17,897	15,186	61.0	898,682	369,941	406	92	18.5	21
	1922	4,683	779,265	788,663	16,959	13,656	69.9	762,155	349,422	327	137	29.6	...
Southern Pacific Lines (in Tex. and La.)[1]	1923	3,710	685,431	685,402	4,628	13,695	59.8	851,485	352,808	237	59	19.8	11
	1922	3,710	659,444	662,808	6,906	14,076	65.3	815,752	362,668	195	101	34.2	1
Texas & Pacific	1923	1,953	305,307	305,307	3,041	6,813	60.4	392,416	144,351	173	31	15.3	10
	1922	1,953	297,812	297,827	6,782	7,400	70.3	391,088	164,273	113	95	45.7	1

[1]Includes Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with December, 1922, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Passenger service: Train-miles	Passenger-train car-miles
New England Region:														
Boston & Albany	1923 1,990	5,926	7,916	3.5	....	986	389	21.1	461	33.4	9,265	202	312,136	2,136,438
	1922 1,714	8,236	9,950	3.2	....	907	385	22.6	396	25.4	9,998	236	315,852	2,066,205
Boston & Maine	1923 14,022	16,955	30,977	11.2	....	1,125	460	21.5	270	18.5	3,411	173	836,917	4,533,950
	1922 12,441	24,222	36,663	11.5	....	1,014	434	21.6	238	15.1	3,556	211	823,234	4,496,593
N. Y., New H. & Hartf.	1923 20,459	17,675	38,134	18.7	....	1,241	523	21.7	220	14.7	4,242	166	1,047,202	6,828,322
	1922 16,421	32,359	48,780	17.4	....	1,155	507	22.2	151	9.4	3,740	224	1,018,827	6,568,026
Great Lakes Region:														
Delaware & Hudson	1923 9,361	6,238	15,599	5.2	....	1,762	875	33.3	701	34.2	12,323	209	193,540	1,047,855
	1922 8,303	9,620	17,923	7.0	....	1,605	822	33.9	538	24.5	10,883	240	192,485	1,013,526
Del., Lack. & Western	1923 15,435	11,224	26,659	4.0	110	1,703	750	25.5	530	32.4	14,226	192	495,753	3,737,694
	1922 12,832	11,612	24,444	5.3	30	1,625	762	27.9	509	28.1	12,526	246	486,217	3,522,667
Erie (inc. Chi. & Erie)	1923 29,769	20,587	50,356	6.5	....	2,088	954	27.8	608	33.6	13,260	139	669,809	5,257,239
	1922 22,162	37,116	59,278	9.5	....	1,950	957	29.0	608	29.7	15,616	166	581,417	4,284,962
Lehigh Valley	1923 22,316	11,954	34,270	5.4	350	1,675	771	28.7	470	26.6	12,242	178	351,569	2,760,166
	1922 22,712	19,791	42,503	5.4	....	1,576	818	31.2	297	13.3	9,573	230	349,692	2,673,889
Michigan Central	1923 12,299	17,199	29,498	5.9	1,536	1,669	643	20.8	408	31.0	6,590	136	606,996	5,429,595
	1922 7,478	19,390	26,868	7.8	....	1,635	696	23.2	512	32.9	7,524	149	590,610	5,299,885
New York Central	1923 61,966	83,303	145,269	5.9	13,663	2,088	885	26.3	430	27.5	9,654	130	2,643,975	21,699,019
	1922 55,827	105,783	161,610	10.4	....	1,996	922	28.6	482	27.0	12,018	148	2,619,509	20,526,647
New York, Chic. & St. L.	1923 9,554	11,110	20,664	5.7	1,910	1,435	576	22.3	693	48.5	8,582	145	214,432	1,124,956
	1922 3,665	16,756	20,421	9.2	....	1,329	580	23.5	706	42.6	8,632	172	218,918	1,071,713
Pere Marquette	1923 8,984	12,044	21,028	3.1	1,645	1,367	618	25.9	370	22.3	3,539	141	265,950	1,448,167
	1922 5,507	16,622	22,129	6.9	....	1,326	650	26.3	346	18.0	3,508	170	253,700	1,308,737
Pitts. & Lake Erie	1923 10,486	10,102	20,588	3.1	1,131	2,609	1,500	44.5	303	11.3	27,000	86	118,832	628,137
	1922 8,156	14,109	22,265	20.3	....	2,441	1,429	43.2	361	13.1	34,729	86	115,997	616,981
Wabash	1923 11,028	13,746	24,774	2.4	509	1,474	609	23.0	552	36.0	5,655	164	508,500	2,955,939
	1922 6,422	14,379	20,801	5.5	....	1,487	677	23.1	573	32.3	4,927	183	438,181	2,627,001
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio	1923 64,594	36,856	101,450	5.9	14,349	1,659	781	29.9	454	25.0	8,844	192	1,544,850	10,093,219
	1922 47,247	63,064	110,311	9.2	....	1,625	828	31.4	513	24.6	10,814	214	1,391,531	8,935,973
Central of New Jersey	1923 15,943	11,527	27,470	7.0	1,199	1,546	745	31.5	246	12.8	9,717	204	342,686	1,645,511
	1922 12,031	16,331	28,362	6.4	....	1,405	704	33.4	247	12.1	10,097	214	336,399	1,611,152
Chicago & Eastern Ill.	1923 14,352	4,359	18,711	13.7	3,013	1,502	726	30.7	313	17.1	6,196	196	249,288	1,585,706
	1922 10,083	7,482	17,565	16.6	....	1,522	792	32.9	388	18.4	7,214	209	222,145	1,440,403
Cleve., Cin., Chic. & St. L.	1923 15,277	22,033	37,310	5.1	5,418	1,857	875	30.6	521	28.3	8,185	137	747,567	4,678,485
	1922 9,632	25,086	34,718	10.5	....	1,780	893	30.5	608	29.2	8,876	157	731,680	4,526,143
Elgin, Joliet & Eastern[2]	1923 9,917	6,009	15,926	5.7	....	2,352	1,259	41.4	297	11.1	10,272	137	.....	.....
	1922 8,400	5,885	14,285	10.2	....	*2,252	1,239	43.3	402	14.2	12,508	147	.....	.....
Long Island	1923 1,526	5,517	7,043	0.9	22	781	298	23.2	61	4.6	1,094	356	200,243	1,195,736
	1922 1,628	6,445	8,073	3.6	....	747	301	24.2	57	3.9	1,179	412	188,769	1,106,936
Pennsylvania System	1923 190,422	102,148	292,570	5.9	48,068	1,733	837	32.3	414	20.4	11,119	154	5,172,636	35,955,731
	1922 151,246	143,779	295,025	7.4	5,933	1,646	841	33.9	425	19.3	11,503	190	5,233,685	36,239,667
Philadelphia & Reading	1923 19,527	18,199	37,726	3.3	....	1,612	823	34.8	470	22.3	15,875	187	514,055	2,466,458
	1922 13,741	26,884	40,625	3.8	....	1,615	875	35.9	540	22.5	19,608	203	502,942	2,343,255
Pocahontas Region:														
Chesapeake & Ohio	1923 30,929	10,291	41,220	6.4	2,433	2,032	1,100	41.4	833	37.1	13,444	146	473,468	2,772,951
	1922 31,185	18,267	49,452	11.9	....	2,218	1,242	41.0	642	24.0	12,441	153	445,910	2,651,263
Norfolk & Western	1923 27,871	9,712	37,583	3.0	1,242	2,201	1,154	41.6	793	32.6	13,363	189	426,438	2,994,152
	1922 26,466	13,511	39,977	4.3	....	1,941	1,064	42.9	676	25.5	12,140	235	421,675	2,715,855
Southern Region:														
Atlantic Coast Line	1923 19,555	16,461	36,016	3.4	....	1,238	463	20.1	328	27.0	2,426	141	874,724	6,634,030
	1922 13,668	16,538	30,206	12.4	....	1,240	486	20.9	392	29.8	2,435	138	817,540	5,707,894
Central of Georgia	1923 3,868	4,941	8,809	4.9	....	1,064	456	23.4	485	31.2	2,238	163	360,663	2,157,053
	1922 1,691	6,225	7,916	6.5	....	1,065	499	24.9	560	31.1	2,325	195	338,188	1,850,226
I. C. (inc. Y. & M. V.)	1923 42,900	23,618	66,518	4.4	505	1,667	726	28.5	642	38.0	6,888	152	1,576,217	9,700,360
	1922 23,709	37,194	60,903	5.5	....	1,612	775	29.5	859	43.4	8,523	169	1,495,907	8,989,963
Louisville & Nashville	1923 39,826	20,833	60,659	6.3	72	1,120	523	30.9	450	24.5	5,430	185	1,064,715	6,466,338
	1922 24,635	28,204	52,839	11.3	38	1,089	537	31.0	518	25.9	5,447	210	1,028,144	6,177,278
Seaboard Air Line	1923 11,039	10,121	21,160	12.6	100	1,226	457	21.5	378	29.0	2,249	164	642,387	4,109,086
	1922 9,591	14,433	24,024	25.3	....	1,160	485	23.3	348	22.7	2,357	185	599,943	3,633,583
Southern Ry.	1923 36,342	28,391	64,733	3.3	....	1,195	486	22.3	345	24.4	3,215	198	1,372,810	8,677,249
	1922 25,778	36,103	61,881	8.6	....	1,155	514	24.1	421	25.3	3,750	220	1,356,376	8,134,687
Northwestern Region:														
Chic. & North Western	1923 45,886	30,192	76,078	6.0	11,761	1,294	527	24.3	342	23.0	3,078	166	1,594,874	10,349,095
	1922 32 352	36,340	68,692	6.8	3,768	1,168	524	26.6	420	25.0	3,441	191	1,582,589	9,739,748
Chic., Milw. & St. Paul	1923 50,893	26,587	77,480	6 2	6,300	1,410	637	25.7	436	25.9	3,077	168	1,489,870	9,032,247
	1922 34,858	34,766	69,624	8.8	....	1,359	641	27.6	555	30.8	3,506	196	1,485,908	9,100,659
Chic., St. P., Minn. & Om.	1923 3,626	10.329	13,955	7.2	2,076	1,012	417	23.0	307	20.5	2,483	174	308.594	1,806,503
	1922 1,967	8,704	10,671	9.8	21	965	411	24.6	411	25.9	2,542	213	290,534	1,790,632
Great Northern	1923 45,268	10,495	55,763	6.1	....	1,542	718	26.2	323	17.5	2,181	165	971,636	6,049,056
	1922 35,911	12,532	48,443	7.3	....	1,365	649	28.5	439	23.5	2,575	213	973,695	5,946,755
M., St. P. & S. Ste. M.	1923 18,996	5,740	24,736	6.2	445	1,171	530	23.3	322	19.9	1,819	134	433,925	2,559,117
	1922 14,319	8,391	22,710	7.3	150	1,080	522	26.7	496	27.8	2,588	155	433,771	2,574,557
Northern Pacific	1923 33,431	13,543	46,974	5.4	4,550	1,571	737	26.2	382	20.2	2,799	137	813,148	5,308,510
	1922 25.850	9,985	35,835	8.5	....	1,381	629	28.2	576	32.9	3,231	170	826,776	5,408,831
Oreg.-Wash. R. R. & Nav.	1923 6,992	5,055	12.047	2.8	....	1.368	646	26.7	331	17.0	1,827	243	248,467	1,688,415
	1922 3,933	4,181	8,114	3.0	....	1,275	597	27.4	547	28.9	2,069	276	261,314	1,749,233
Central Western Region:														
Atch., Top. & S. Fe	1923 47,216	17,798	65,014	6.0	5,019	1,589	560	20.5	445	35.1	2,938	153	1,812,420	14,437,685
	1922 38,459	28,823	67.282	5.2	854	1,474	562	22.0	522	37.1	3,579	169	1,776,013	13,408,312
Chicago & Alton	1923 9.080	6,489	15.569	4.4	1,500	1,389	597	27.0	384	24.2	5,917	172	290,924	1.831,265
	1922 5,984	9,704	15.688	8.0	....	1,300	611	28.4	443	23.7	6,877	232	292.660	1,738,748
Chic., Burl. & Quincy	1923 48,238	22,652	70.890	5.8	....	1,569	716	27.8	520	30.3	3,948	176	1,486,963	9,880,817
	1922 35,164	34,108	69.272	6.7	59	1,565	755	30.2	630	33.2	4,683	196	1,488,061	9,846,780
Chic., Rock I. & Pacific	1923 31,427	25,788	57,215	7.6	7,506	1,198	477	23.0	389	27.7	2,912	190	1,268,890	7,594,121
	1922 20,090	19,757	39,847	11.3	117	1,104	493	24.1	532	31.9	2,775	220	1,295.523	7,509,023
Denver & R. G. Wn.	1923 13.162	4,105	17.267	5.0	3,835	1,261	595	28.1	284	15.3	1,894	261	224,508	1,492,894
	1922 10,378	6,366	16.744	9.6	507	1,189	555	28.7	313	17.0	2,021	286	227.794	1,586,730
Oregon Short Line	1923 7,769	6,007	13,776	3.5	....	1,381	638	27.9	523	27.8	3,047	167	281.724	2.044,832
	1922 5,465	5,823	11.288	5.3	30	1,344	624	30.3	774	41.6	3,691	171	282,769	2.057,411
Southern Pac. (Pac. Sys.)	1923 21,307	26.212	47,519	5.0	1,568	1,611	614	23.1	542	38.5	3,709	158	1,497,862	12,143,398
	1922 16 940	21,929	38,869	4.9	....	1,615	654	23.3	646	42 6	3,629	161	1,363,668	11,202,913
Union Pacific	1923 15.516	9,983	25,499	10.0	....	1,737	725	22.8	879	54.8	6,037	156	843,376	7,096,343
	1922 11,669	12,333	24,002	6.1	7	1,379	596	25.6	1,137	68.8	7,357	192	881,356	7,084,826
Southwestern Region:														
Gulf, Colo. & Santa Fe	1923 8,842	4,644	13,486	3.4	1,475	1,523	644	24.1	370	24.0	2,631	130	199,334	1,264,649
	1922 5,688	6,644	12,332	3.8	461	1,451	645	25.8	461	27.6	2,994	155	201,408	1,215,536
Missouri-Kansas-Texas	1923 8,484	7,462	15,946	5.0	3,606	1,740	665	22.3	338	25.9	2,992	139	281,522	1,965,824
	1922 7,303	12,796	20,099	6.7	....	1,432	609	23.8	294	18.8	2,973	181	288.375	2,107,339
Mo.-Kans.-Tex. of Texas	1923 273	11,594	11.867	11.7	3,122	1,308	480	21.3	244	19.5	2,086	158	252,164	1,615,060
	1922 399	11,746	12.145	9.0	....	1,083	445	23.0	250	16.6	1,746	195	213,664	1,449,218
Missouri Pacific	1923 26.253	23,006	49.259	7.2	....	1,420	615	25.3	466	29.1	3,145	158	1,073.194	6,099,655
	1922 20,008	36,353	56,361	7.5	....	1,274	601	26.3	337	17.9	2,670	201	978.231	5,664,234
St. Louis-San Francisco	1923 18.544	13.652	32.196	5.2	....	1,103	454	24.4	371	24.9	2,548	191	763,419	4,663,163
	1922 12,698	23,331	36,029	6.5	....	978	448	25.6	313	17.5	2,407	254	725,269	4,208,852
Southern Pacific Lines (in Tex. and La.)[1]	1923 7,528	17.861	25,389	4.3	1.983	1,246	516	25.8	448	29.1	3,067	135	540,152	3,907,046
	1923													
	1922 5,934	17,303	23.237	4.8	....	1,237	550	25.8	503	29.9	3,153	143	542,936	3,668.512
Texas & Pacific	1923 5,045	8,112	13,157	7.4	....	1,285	473	21.2	354	27.6	2,385	157	290,630	1,980,565
	1922 4,019	11,969	15,988	12.7	....	1,313	552	22.2	331	21.2	2,714	185	290,021	1,896,018

[2]No passenger-train service.

Correction

In connection with the article entitled "Handling Car Repair Bills Efficiently," which appeared in the *Railway Age* of February 9, page 371, and dealt with methods used on the Norfolk & Western, neglect was made to mention that the article was based on an article dealing with this subject written by J. C. Johnson, chief clerk in the office of the general car inspector of that road, appearing in the December issue of the Norfolk & Western Magazine. The article prepared by Mr. Johnson was used in part and was amplified by data supplied by the Burroughs Adding Machine Company.

Revenues and Expenses for 1923

The Interstate Commerce Commission's summary of revenues and expenses of Class I roads for December and the year 1923 is as follows:

Item	United States December 1923	United States December 1922	United States *a* Twelve Months 1923	United States *a* Twelve Months 1922
Average number of miles operated	235,671.32	235,591.98	235,661.83	235,700.78
Revenues:				
Freight	$344,138,442	$364,176,066	$4,624,398,830	$4,009,251,951
Passenger	*b*101,095,318	*c*98,494,081	*e*1,147,751,691	*f*1,076,314,793
Mail	9,276,749	9,365,822	93,247,284	91,026,621
Express	13,251,126	15,515,890	152,950,504	143,348,849
All other transportation	15,823,593	15,223,749	197,643,204	178,014,218
Incidental	10,220,542	10,012,900	133,453,846	114,478,512
Joint facility Cr.	895,077	983,313	10,139,878	10,198,758
Joint facility Dr.	237,105	207,750	2,694,500	2,231,980
Ry. oper. revenues	494,463,742	513,564,071	6,356,890,737	5,620,401,722
Expenses:				
Maintenance of way and structures	61,785,586	56,937,745	821,376,694	736,181,212
Maint. of equipment	113,926,049	116,994,179	1,474,890,588	1,259,996,915
Traffic	8,238,845	7,582,267	94,187,696	86,743,887
Transportation	187,034,225	205,821,569	2,350,958,500	2,176,016,900
Misc. operations	4,206,646	4,131,495	50,853,958	47,970,758
General	14,578,088	14,520,908	163,335,848	158,003,972
Transportation for investment Cr.	1,620,466	954,936	11,675,139	7,291,171
Ry. oper. expenses	388,148,973	405,033,227	4,943,928,145	4,457,622,473
Net revenue from railway operations	106,314,769	108,530,844	1,412,962,592	1,162,779,249
Railway tax accruals	28,830,981	23,069,792	336,381,765	305,479,515
Uncollectible railway revenues	606,995	281,766	2,075,953	1,503,297
Ry. oper. income	76,876,793	85,179,286	1,074,504,874	855,796,437
Equipment rents Dr. balance	5,213,302	4,615,506	75,024,633	60,062,673
Joint facility rent Dr. balance	1,968,747	1,526,295	21,822,873	18,853,171
Net railway oper. income	69,694,744	79,037,485	977,657,368	776,880,593
Ratio of expenses to revenues (%)	78.50	78.87	77.77	79.31

a Does not include Boston & Albany, the revenues and expenses of which are included in New York Central Report.
b Includes $3,117,714 sleeping and parlor car surcharge.
c Includes $3,021,030 sleeping and parlor car surcharge.
d Deficit or other reverse items.
e Includes $37,488,509 sleeping and parlor car surcharge.
f Includes $33,087,875 sleeping and parlor car surcharge.

Unfavorable Report on Alternative Grade Crossing Elimination Plan for Toronto

Previous to the outbreak of the war the railways entering Toronto—the Canadian Pacific and the Grand Trunk—entered into an agreement with the city for the construction of a new union station and in conjunction therewith a viaduct carrying their tracks from the eastern limits of the city to the station. Three or four years ago the station building was completed at a cost estimated at about $3,000,000, but up to the present the viaduct is lacking, the reason given by the railways being that during the war money was needed for other projects and the viaduct could wait. Consequently the new station has never been opened.

On the city's side there has been a constant agitation for the building of the viaduct and calling upon the railways to keep their part of the bargain. A few months ago the heads of the two railways—E. W. Beatty of the Canadian Pacific and Sir Henry Thornton of the Canadian National—met a large meeting in Toronto of the representatives of the various interests and told them that the railways admitted that they must do something soon to show Toronto they meant to fulfil the agreement, and shortly afterwards the engineers of the two roads submitted plans to the city of an alternative viaduct scheme. The original viaduct plan would have cost, it is estimated, nearly $30,000,000, while the city's engineers estimate that the alternative plan would cost a little over $21,000,000.

City and harbor board authorities of Toronto last week submitted reports on the railways' alternative scheme, both reports strongly opposing the acceptance by the city of the railways' alternative plan. They argue that the alternative scheme, which provides for the use of bridges instead of subways at certain street intersections, would militate against the city's program of further developing the industrial district at the waterfront where a large amount of land has been reclaimed from the bay. It would, they say, also subtract from the value of the waterfront improvements of the city and Harbor Board which have cost to date over $30,000,000.

Prizes Awarded for Safety Poster

The special committee to determine the winners in the contest conducted by the American Railway Association for the most appropriate poster and slogan to be used in connection with the intensive campaign that association will conduct in an effort to reduce the number of grade crossing accidents, held a meeting in Washington on February 26 and announced the following winners:

Winner of the first prize of $500 for the best poster and also the cash prize of $100 for the most appropriate slogan, Martin H. Gambee, 118 Willoughby avenue, Brooklyn, N. Y.

Second prize of $200 for the second best poster, R. S. Feeley, Baldwinsville, N. Y.

Third prize of $100 for third best poster, H. Day Lowry, Richmond, Va.

The winning poster carries the slogan, "Wait! You may lose," and shows an automobile which has been stopped beside a railroad track while a large locomotive pulling a heavy train speeds over the crossing. The poster is in yellow, red and black, showing the contrast between the heavy train and the light automobile and the superiority in power and weight of the steel monster compared with the lighter means of transportation. The committee which made the awards follows:

C. C. McChord, Washington, D. C., member of the Interstate Commerce Commission; H. G. Taylor, Lincoln, Neb., president, National Association of Railway & Utilities Commissioners; Thomas P. Henry, Detroit, Mich., president, American Automobile Association; L. A. DeBlois, Chicago, president, National Safety Council; Col. Charles Clifton, Buffalo, N. Y., president, National Automobile Chamber of Commerce; Col. A. B. Barber, Washington, D. C., Department of Transportation, United States Chamber of Commerce; H. A. Rowe, New York City, chairman, Committee on Prevention of Highway Crossing Accidents, American Railway Association, who will be in general charge of the safety crossing campaign.

In making the awards the committee considered 5,000 posters made by artists in all parts of the country and more than 20,000 slogans, according to tabulations made today after the committee had completed its work. The date for opening the intensive campaign to reduce the number of grade crossing fatalities has so far not been determined but will be announced shortly. It is estimated that more than 2,500 persons or more than 200 a month will be killed at grade crossings in 1924 due almost entirely to automobile accidents while approximately 6,000 persons will be injured or about 500 a month.

While in Washington the committee called on President Coolidge at the White House.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 6-9, 1924, Montreal, Canada. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Joseph Sinkler, Pilot Packing Company, 122 South Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—Grant Williams, 1341 Railway Exchange, Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 3, 1924, Montreal, Canada.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St, New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 400, Union Station, St. Louis, Mo. Next meeting, June 18-20, 1924, Buffalo, N. Y.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION:
Division I.—Operating, J. C. Caviston, 30 Vesey St., New York, N. Y.

Freight Station Section (including former activities of American Association of Freight Agents).—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association).—J. C. Caviston, 30 Vesey St., New York, N. Y.

Safety Section.—J. C. Caviston, 30 Vesey St., New York. Annual meeting, June 24-26, Newhouse Hotel, Salt Lake City, Utah.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents).—W. A. Fairbanks, 30 Vesey St., New York, N. Y.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Annual meeting, March 11-13, 1924, Congress Hotel, Chicago. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section.—E. H. Fritch.

Electric Section.—E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York, N. Y. Annual meeting, March 13 and 14, 1924, Drake Hotel, Chicago. Next "stated meeting," Sept. 22, 1924, Ocean View Hotel, Swampscott, Mass.

Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 11-18, 1924, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI.—Purchases and Stores, including former activities of the Railway Storekeepers' Association).—W. J. Farrell, 30 Vesey St., New York, N. Y. Annual meeting, June 16-18, Chalfonte-Haddon Hall, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Next convention, April 13, 1924, Hotel Roosevelt, New Orleans, La.

Car Service Division.—C. A. Buch, 17th and H Sts., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next annual convention, Oct. 21-23, 1924, Kansas City, Mo. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—W. H. Hill, Agricultural Agent, New York Central, Chicago. Next annual meeting, May 14-16, 1924, Savannah, Ga.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 11-13, 1924, Congress Hotel, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—J. A. Duca, Tool Foreman, C. R. I. & P. Ry., Shawnee, Okla. Annual convention, August 28-30, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, 1319-21 F. St., N. W., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio. Next convention, Sept. 22-26, Commonwealth Pier, Boston.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce St., Philadelphia, Pa. Annual meeting, June 23-27, Chalfonte-Haddon Hall, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Prof. J. H. Dunlap, 33 W. 39th St., New York. Regular meetings 1st and 3rd Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, A. F. Stuebing, Chief Engineer, Bradford Draft Gear Co., 23 W. 43rd St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—P. R. Hicks, Room 1146, Otis Bldg., Chicago. Next convention, 1925, Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific Ry., St. Paul, Minn. Annual meeting, May, 1924, West Baden, Ind.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting, June, 1924, Atlantic City, N. J. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H Sts., N. W., Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—John Nelson, Joseph E. Nelson & Sons, 3240 South Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrook St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMAN'S ASSOCIATION OF ST. LOUIS, MO.—R. E. Giger, 721 North 23rd St., East St. Louis, Ill. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2nd Thursday, January to November. Interim meetings, 2nd Thursday, February, April, June, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—Bradley S. Johnson, W. H. Miner, Rookery Bldg., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2nd Tuesday in February, May, September and November.

DIXIE RAILWAY CLUB.—T. C. Schley, 71 Conti St., Mobile, Ala. Regular meetings, bi-monthly, second and fourth Fridays, Battle House Hotel, Mobile, Ala.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3rd Friday in month, Room 1414, Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, August 19-21, 1924, Hotel Sherman, Chicago Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. B. Hutchison, 6000 Michigan Ave., Chicago. Next convention, May 26-29, 1924, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Annual convention, September 2-5, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—Bard Browne, Superheater Co., 17 E. 42nd St., New York. Meeting with International Railway Fuel Association.

MASTER BOILER MAKER'S ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 20-23, 1924, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—J. S. Penney, T. J. Moss Tie Company, St. Louis, Mo. Next convention, 1925, Chicago.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, Nov. 11, 1924, Phoenix, Ariz.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: E. R. Cott, Safety Agent, Hocking Valley Ry., Columbus, O.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2nd Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2nd Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Bread and Chestnut St., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—H. A. Varney, Sunbeam Electric Manufacturing Co., Evansville, Ind. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at meetings of A. R. A., Division V. and VI., June 11-18, 1924, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa. Annual meeting, September 18 and 19, Montreal, Canada.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next convention, September 16-18, 1924, New York Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2nd Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHEASTERN CARMEN'S INTERCHANGE ASSOCIATION.—J. E. Rubley, Southern Railway Shops, Atlanta, Ga. Meets semi-annually.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3rd Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. L. Carrier, Car. Serv. Agent, Tenn. Cent. Ry., 319 Seventh Ave, North Nashville, Tenn.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Next convention, September 9-14, 1924, Chicago. Exhibit by Railway Equipment Manufacturers' Assn.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 605 North Michigan Ave., Chicago. Regular meetings, 3rd Monday each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Bldg., Chicago, Ill.

Commission and Court News

Interstate Commerce Commission

The commission has adopted the following ruling:

Upon inquiries as to the effect of the decision rendered on February 19, 1923, by the Supreme Court of the United States, in *Kans. City So. Ry.* v. *Wolf*, 261 U. S., 133, the commission construes that decision and paragraph 3 of section 16 of the interstate commerce act as prohibiting common carriers subject to the act from paying, subsequent to the two-year period of limitation contained in that paragraph, claims for overcharges presented to the carriers by shippers or consignees either within or subsequent to said two-year period of limitation, unless within said two-year period the claims have been presented to the commission or to a court of competent jurisdiction, in accordance with the applicable provisions of said act.

Right to Examine I. C. C. Valuation Data

The decision, adverse to the railroad, in the valuation case of the St. Louis Southwestern, briefly reported last week, page 467, was based mainly on the argument of the commission that examination of its records would be a costly waste of time and an interference with regular work. The commission made a tentative valuation of the property of the road under section 19a of the Interstate Commerce Act. The railroad protested the valuation, as to cost of reproduction, present cost of condemnation or purchase of land, and on other points. The commission's order held that data prepared by and information in the possession of the Bureau of Valuation should not be open to inspection unless offered in evidence; inspection would unnecessarily prolong the work, and greatly increase the expense; and would seriously interfere with due performance of the regular duties of the commission's employees. The Supreme Court of the District of Columbia decided against the road and the judgment was affirmed by the Court of Appeals. The Supreme Court of the United States has affirmed the judgment.

"The statute," says the court, "provides for a hearing before the commission, but it does not follow necessarily that the parties to the proceeding are subject to the same rule when the data are desired as evidence. The hearing, to be sure, is not of the ordinary kind. The railroads have no adversary. The commission, of course, has no object except to arrive at the truth. It is not to be cross-examined for bias or otherwise as to its capacity to decide or modes of deciding what is entrusted to it, but on the other hand, since it must grant a hearing, manifest justice requires that the railroads should know the facts that the commission supposes to be established, and we presume that it would desire the grounds of its tentative valuation to be subjected to searching tests. But there are necessary limits. While there can be no public policy or relation of confidence that should prevail against the paramount claim of the roads, the commission must go on, and cannot be stopped as it would be if many of the railroads concerned undertook an examination of all its papers to see what they could find out. . . . . We cannot doubt that the commission will do all in its power to help the relator to whatever it justly may demand. As yet it has made no just demand, for we accept the commission's statement that a general examination in the commission's offices would interfere too much with its work. Moreover, at the hearing there will be limits, at the discretion of the commission, to the right to delay the sittings by minute inquiries that might protract them indefinitely. See Newton v. Consolidated Gas Co., 258 U. S. 165, 175. But subject to that discretion we think that in such way as may be found practicable the relator should be enabled to examine and meet the preliminary data upon which the conclusions are founded, and to that end should be given further information in advance of the hearing, sufficient to enable it to point out errors if any there be. No present need is shown for the issue of subpoenas, and with this intimation of our view of the railroad's rights we repeat our opinion that the judgment should be affirmed." United States on relation of St. Louis Southwestern v. Interstate Commerce Commission. Decided February 18, 1924. Opinion by Justice Holmes.

Equipment and Supplies

Locomotives

THE SOUTHERN RAILWAY is inquiring for 25 locomotives.

THE INDIANA HARBOR BELT may buy from 5 to 10 Mikado type locomotives.

THE PITTSBURGH & WEST VIRGINIA has placed an order for one Pacific type locomotive.

THE UNITED STATES GYPSUM COMPANY has placed an order for two switching type locomotives.

PICKARDS MATHER & Co. has ordered six 0-6-0 type locomotives from the American Locomotive Company.

THE LOUISVILLE & NASHVILLE is inquiring for 18 Mikado type, six Pacific type, and six 8-wheel switching type locomotives.

THE INTERNATIONAL-GREAT NORTHERN has ordered six Mikado type locomotives from the Baldwin Locomotive Works, instead of five locomotives, as was reported in the *Railway Age* of February 2.

THE MAINE CENTRAL, reported in the *Railway Age* of January 26 as inquiring for two Pacific type and six Mikado type locomotives, has ordered this equipment from the American Locomotive Company.

THE CANADIAN NATIONAL, reported in the *Railway Age* of February 23 as contemplating buying about 50 locomotives, has ordered from the Montreal Locomotive Works, Ltd., 15 Mountain type, 30 Mikado type and 5 Santa Fe type locomotives. Ten 8-wheel switching locomotives have been ordered from the American Locomotive Company for use on lines in the United States.

THE NEW YORK CENTRAL has ordered 61 Mikado type locomotives from the American Locomotive Company and 40 Mikado type locomotives from the Lima Locomotive Works. Bids are wanted by W. C. Bower, manager of purchases and stores, New York, until 12 o'clock noon, April 28, for electric locomotives required by the New York Central Railroad and the Michigan Central.

Freight Cars

THE CARNEGIE STEEL COMPANY is inquiring for 15 tank cars of 12,500 gal. capacity.

THE GREAT WESTERN OF BRAZIL is inquiring for 50 box cars, 50 gondola cars and 5 tank cars.

THE SPOKANE, PORTLAND & SEATTLE has ordered 60 logging cars from the Magor Car Corporation.

THE UNION REFRIGERATOR TRANSIT COMPANY, Milwaukee, Wis., may build 300 refrigerator cars in its own shops.

THE MISSOURI PACIFIC is inquiring for repairs on 500 box cars, 250 composite gondola cars and 300 steel gondola cars.

THE LEHIGH VALLEY has given a contract to the American Car & Foundry Co., for making repairs to 300 box cars.

THE EAST JERSEY RAILROAD & TERMINAL CO. has ordered 64 10,000 gal. tank cars from the American Car & Foundry Co.

THE GARY TUBE COMPANY is inquiring for 20 flat skelp cars of 100 tons' capacity and 16 flat skelp cars of 70 tons' capacity.

THE NORFOLK & WESTERN is inquiring for prices on the rebuilding, to include new bodies, of 1,000 all steel gondola cars of 57½ tons' capacity.

THE NEW YORK CENTRAL has let contracts for the repair of 500 flat cars to the Pennsylvania Car Company and for 500 to the Youngstown Steel Car Company.

H. L. DOHERTY & Co., New York, reported in the *Railway Age* of February 2 as inquiring for 370 tank cars, has ordered this equipment from the American Car & Foundry Co.

THE OLIVER IRON MINING COMPANY, reported in the *Railway Age* of January 26 as inquiring for 25 stripping cars, has ordered 25 air dump cars from the Magor Car Corporation.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of January 26 as inquiring for 500, 40-ton flat cars, has ordered this equipment from the American Car & Foundry Co.

THE OLIVER IRON MINING COMPANY, reported in the *Railway Age* of January 5 as inquiring for 7 flat cars, has ordered this equipment from the Mount Vernon Car Manufacturing Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS, reported in the *Railway Age* of January 26 as inquiring for 50 steel hopper ballast cars, has ordered this equipment from the Tennessee Coal, Iron & Railroad Co.

THE CANADIAN NATIONAL is inquiring for 500 general service cars and 50 caboose cars in addition to the 1,000 box cars and the 150 Hart convertible cars, reported in the *Railway Age* of February 23.

THE MAINE CENTRAL, reported in the *Railway Age* of January 26 as inquiring for 100 gondola cars and 250 box cars, has ordered the gondola cars from the Standard Steel Car Company and the box cars from the Laconia Car Company.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of February 23 as inquiring for 4,000 freight cars, is now inquiring for 1,650 single sheathed box cars, 1,000 single sheathed automobile cars, 1,100 composite drop bottom gondola cars, 1,100 steel drop bottom gondola cars and 150 steel underframe flat cars.

THE NEW YORK CENTRAL has ordered 3,500, 70-ton hopper cars from the Standard Steel Car Company; 3,500, mostly box cars, from the American Car & Foundry Company; 1,500, 70-ton hopper cars, and 1,000 automobile cars from the Pressed Steel Car Company. This is in addition to the 5,000 cars ordered by this company, as was reported in the *Railway Age* of February 23.

Passenger Cars

THE FLORIDA EAST COAST contemplates buying about 10 cars for passenger service.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for four baggage cars, three passenger cars, and one dining car.

THE MAINE CENTRAL, reported in the *Railway Age* of January 26 as inquiring for 4 baggage and mail cars, 6 coaches and 3 smoking cars, has ordered this equipment from the Standard Steel Car Company.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of February 16 as inquiring for 23 passenger cars, is now inquiring for 10 interurban cars, four steel coaches, five chair cars and four baggage and mail cars.

THE SOUTHERN RAILWAY is inquiring for 25 steel coaches, 69 ft. long; 12 steel combination baggage and express cars, 60 ft. long; two steel postal cars, 60 ft. long; six steel combination mail and baggage cars, 60 ft. long, and five steel dining cars.

THE NEW YORK CENTRAL, reported in the *Railway Age* of February 23 as having placed orders for 233 cars, has ordered 10 additional dining cars from the Pullman Company, and 10 additional baggage cars from the American Car & Foundry Company. The company is also considering the purchase of 10 more baggage cars.

Machinery and Tools

THE PENNSYLVANIA has placed an order for a 42-in. boring mill.

THE SOUTHERN PACIFIC has placed an order for a car box borer.

THE NEW YORK CENTRAL has placed an order for a 30-in. by 10-ft. planer.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for one 50-ton wrecking crane.

THE LEHIGH VALLEY has ordered three 27½-ton locomotive cranes from the Industrial Works.

THE CHICAGO & WESTERN INDIANA has ordered one 5-ton pillar crane from the Whiting Corporation.

THE CANADIAN NATIONAL is inquiring for two 15-ton, two 20-ton and two 25-ton locomotive cranes.

THE GREAT NORTHERN is inquiring for one 30-ton standard gage eight-wheel locomotive crane for use at St. Paul, Minn.

THE RICHMOND, FREDERICKSBURG & POTOMAC has ordered one 12-ton and one 25-ton standard gage eight-wheel locomotive crane from the Orton-Steinbrenner Company.

THE NEW YORK CENTRAL will receive bids at the office of C. S. White, purchasing agent, New York City, until 12 o'clock noon, March 14, for one 2,500 kw. synchronous converter, one 2,760 kva., three phase oil cooled transformer and remote controlled automatic switchboard apparatus and one 2,000 kw. synchronous motor generator set and remote controlled automatic switchboard apparatus.

Miscellaneous

THE NEW YORK CENTRAL will receive bids at the office of W. B. Pollock, manager of the marine department, 6 Beaver street, New York City, until 12 o'clock noon, March 14, for one double-deck, screw-propelled, steel ferry boat.

Signaling

THE SOUTHERN RAILWAY is to install automatic block signals on its line between Austell, Ga., and Birmingham, Ala., 148 miles, using color light signals with block sections usually 1½ miles long. At the same time, two telephone circuits will be installed throughout the line, Atlanta to Birmingham, and telephones will be used for train dispatching. The signal power circuit will have alternating current at 4,400 volts with substations at Atlanta, Birmingham and Oxanna Junction. This circuit will be used also for lighting the passenger stations. The contract for the signals has been let to the General Railway Signal Company.

LOCOMOTIVE AND FREIGHT CAR REPAIR SITUATION

	Locomotives					Freight cars					
Date	No. locomotives on line	No. serviceable	No. stored serviceable	No. req. repairs over 24 hr.	Per cent req. repairs over 24 hr.	Date	No. freight cars on line	Cars awaiting heavy repairs	Cars awaiting light repairs	Total cars awaiting repairs	Per cent of cars awaiting repairs
1923						1923					
January 1	64,453	48,905	576	13,587	21.1	January 1	2,264,593	164,041	51,970	216,011	9.5
April 1	64,559	50,107	914	12,801	19.8	April 1	2,296,997	154,302	52,010	206,312	9.0
July 1	63,906	52,456	2,181	10,326	16.2	July 1	2,260,532	146,299	44,112	190,411	8.4
October 1	63,982	54,159	2,620	8,787	13.7	October 1	2,270,840	118,563	32,769	151,332	6.7
November 1	64,192	54,080	2,517	9,163	14.3	November 1	2,263,099	116,084	34,540	150,624	6.6
December 1	64,336	53,764	3,367	9,577	14.9	December 1	2,270,405	116,697	38,929	155,626	6.8
1924						1924					
January 1	64,406	54,031	5,061	9,395	14.6	January 1	2,279,363	118,653	39,522	158,175	6.9
						February 1	2,269,230	115,831	45,738	161,569	7.1

LOCOMOTIVE REPAIR SITUATION—NEW METHOD OF COMPILATION

Date	No. locomotives on line	No. serviceable	No. stored serviceable	No. req. classified repairs	Per cent	No. req. running repairs	Per cent	Total req. repairs	Per cent
February 1	64,377	53,586	4,116	5,919	9.2	4,872	7.6	10,791	16.8

Supply Trade News

The Chicago Pneumatic Tool Company will construct a three-story, 45 ft. by 126 ft. extension to its plant at Cleveland, Ohio.

The Morton Manufacturing Company, Muskegon Heights, Mich., has taken over the sale and distribution of the Robinson patented automatic air hose coupling.

Fred A. Meckert has resigned as general manager of the Fort Pitt Spring & Manufacturing Co., Pittsburgh, Pa., effective March 31, to become president and general manager of the **Mitchell Spring & Manufacturing Co., Inc.,** of Johnstown, Pa. This company was incorporated recently with a capital stock of $350,000. Mr. Meckert has been with the Fort Pitt Spring & Manufacturing Co., since March 1, 1919, having gone to that company from the Standard Steel Works Company, Philadelphia, Pa., where he served for 14 years and in charge of the spring department as manager and spring designer. Before entering the service of the Standard Steel Works Company, Mr. Meckert was employed for three years as private secretary of Albert Ladd Colby, who at that time was assistant to president of the International Nickel Company, in New York City.

F. A. Meckert

Joseph W. Irwin has resigned as superintendent of the Fort Pitt Spring & Manufacturing Co., Pittsburgh, Pa., to take effect on March 31. Mr. Irwin has resigned to take the position of vice-president and general superintendent of the **Mitchell Spring & Manufacturing Co., Inc.,** Johnstown, Pa. Mr. Irwin has had a long operating experience in the manufacture of railroad, electric traction and industrial springs, having been with the Fort Pitt Spring & Manufacturing Co., for the past 12 years. He formerly served for a period of 25 years with the A. French Spring Works which later became the Railway Steel Spring Company, having begun his service with that company as one of the shopmen and working up to the position of assistant superintendent.

J. W. Irwin

The Truscon Steel Company, Youngstown, Ohio, has leased a building at Erie and St. Clair streets, Chicago, to which it will move its Chicago offices on May 1.

Herbert Mertz, secretary and sales manager of the **Orton-Steinbrenner Company,** with headquarters at Chicago, has been elected a director, succeeding H. G. Steinbrenner, resigned.

The Bulldog Automatic Coupler Company, Pikesville, Ky., has been incorporated with the following officers: **A. J. Baldwin,** president, **Charles D. Jacobs,** vice-president, and **A. L. Nunnery,** secretary and treasurer.

G. P. Rogers, general sales and advertising manager of the Pyrene Manufacturing Company, Newark, N. J., has resigned to become vice-president and director of sales and advertising of the **Kant Rust Products Corporation,** Rahway, N. J.

The American Railway Car Company, Portland, Ore., is preparing to erect a factory at Tigard, Ore., for the manufacture of Bowen gasoline railway cars. Officers of the company are **A. B. Bowen,** president, **A. C. Forrester,** vice-president, and **Macdonald Potts,** secretary-treasurer.

J. H. Hackenburg, formerly purchasing agent of the Pressed Steel Car Company, New York, and more recently secretary and treasurer of the Lake Erie Rubber Company, Cleveland, Ohio, has been appointed purchasing agent of the **Illinois Car & Manufacturing Company,** with headquarters at Hammond, Ind.

The Austin Company, Cleveland, Ohio, has been given a contract by the Merkel Brothers Company, Cincinnati, manufacturers and wholesale distributors of plumbing and heating supplies, for a complete new plant consisting of a mill building three stories, 100 ft. by 320 ft.; pipe building two stories, 100 ft. by 220 ft.; garage, boiler room, coal storage and all mechanical equipment, including railroad track installation. The project will cost about half a million dollars.

The Colorado Central Railways Company, Denver, Colo., has been incorporated under the laws of Colorado for the purpose of manufacturing steam and electric railway cars and other railway equipment. It will operate in conjunction with the American Railway Steel Corporation and the Missouri Car Company, East St. Louis, Ill. The company has taken over the plant formerly used by the Denver Paper Company. **Orrin Merry,** president of the Missouri Car Company, is president of the Colorado Central Railways Company and **M. L. Phelps** is consulting engineer.

The Blaw-Knox Company, Pittsburgh, Pa., has adopted an extended payment plan available to all purchasers of its line of standard steel buildings which is designed to simplify the financing of projects for the construction of shops, warehouses, and other industrial structures. The standard terms under the building-finance plan provide for a 10 per cent payment with the order and 23⅓ per cent on delivery, with the balance payable in monthly installments over a period of one year. Companies that prefer to buy buildings outright as heretofore are accorded a cash discount of 5 per cent.

The Hattiesburg Creosoting Company, has purchased the plant of the Southern Creosoting Company, Slidell, La. The latter company is now liquidating and will cease to exist upon completion of the purchase. This plant is one of the oldest and most favorably known commercial creosoting plants in the South, and it is intended to continue its operation with practically no change in the operating force. The main office of the Hattiesburg Creosoting Company will remain at Hattiesburg, Miss. The Hattiesburg Creosoting Company, with the acquisition of the Slidell plant, will now have an annual capacity of 70,000,000 ft. board measure.

William R. Hillary has been appointed sales engineer with headquarters at the home office of the National Lock Washer Company, Newark, N. J. Mr. Hillary is an engineer of wide railroad experience, having started his career with the Pennsylvania Railroad System, as assistant on the engineering corps in the Cincinnati division, immediately upon his graduation from the University of Pennsylvania, in 1897, where he received the degree of civil engineer. He subsequently held many important positions having served consecutively as assistant supervisor, assistant division engineer, division engineer and engineer of maintenance of way, at Toledo, Ohio.

Hobart Ames, for nearly 23 years president of the Ames Shovel & Tool Company, Boston, Mass., has resigned and **Alfred C. Howell,** who was for many years connected with the Bethlehem Steel Company, has been elected as his suc-

cessor, effective February 15, Mr. Howell having previously been elected a director. Mr. Ames will remain as one of the directors, but intends to devote more of his time to his private interests and to no longer act as the chief executive of the company. Mr. Howell's connection with the steel industry extends over a long period of years, he having served in various responsible positions in Bethlehem, Philadelphia, Cincinnati and Pittsburgh with the Bethlehem, Midvale and Carnegie Steel Companies and for a few years as manager of the steel department of the W. Bingham Company, Cleveland, Ohio.

Interstate Iron & Steel Company

The annual report of the Interstate Iron & Steel Company, Chicago, shows net profits for 1923 amounting to $351,060 after all deductions including taxes, interest and depreciation, or the equivalent of $17.08 a share earned on the $2,060,200 of preferred stock outstanding. This compared with a net profit of $231,574 or $11.24 a share on the preferred in 1922. Gross earnings amounted to $1,251,940, the highest since 1920, when earnings amounted to $1,515,914. There was a slight increase in depreciation reserves and taxes but interest charges showed a small reduction as compared with 1922. Current assets aggregated $4,337,470 in which the largest item was inventory, valued at $2,829,371 or $550,000 less than in 1922. Accounts and bills receivable were also lower but the cash balance was increased from $264,281 to $326,124.

The income account for 1923 and the balance sheet as of December, 1923, are as follows:

INCOME ACCOUNT

	1923	1922
Cross earnings after expenses and reserves, except depreciation, taxes and interest	$1,251,940	$1,083,304
Depreciation	395,686	381,455
State and municipal taxes	93,421	92,311
Net income	762,833	609,538
Interest	349,348	377,964
Discount and expense on bonds written off	35,423	.....
Federal taxes	27,000	.....
Net profits	351,062	231,574
Added to surplus	351,060	231,574
Earned a share on preferred stock	$17.08	$11.24

BALANCE SHEET

ASSETS

	1923	1922
Property less depreciation	$10,405,859	$10,213,104
Inventory	2,829,371	3,371,285
Accounts and bills receivable, less reserve	1,139,774	1,351,184
Investments	42,201	42,201
Cash in banks and on hand	326,124	264,281
Deferred charges	428,582	462,067
Total assets	$15,171,911	$15,704,122

LIABILITIES

Preferred stock	$2,060,200	$2,060,200
Common stock	4,000,000	4,000,000
First mortgage bonds	3,909,200	4,000,000
Purchase money obligations	109,000	.....
Current liabilities	1,947,915	2,839,538
Reserves	356,352	366,200
Preferred sinking fund	307,170	307,170
Surplus	2,492,075	2,131,014
Total liabilities	$15,171,911	$15,704,122

American Locomotive Company

The net earnings of $12,376,564, reported by the American Locomotive Company for 1923, were the largest on record and compare with $12,012,567 in the previous record twelve months ended June 30, 1919. The 1923 net, after charges and taxes, is equal after preferred dividends to $21.25 a share on 500,000 shares of no par common stock, or $42.50 a share on the old capitalization. The company in 1922 showed net earnings of $1,100,479, which did not cover the preferred dividends for the year. After the payment of dividends and the setting up of a reserve of $4,500,000 for additions and betterments there was carried to surplus on December 31, $3,626,565, against a deficit of $2,149,521 in 1922, when no reserve was set up.

Andrew Fletcher, president of the company, said in part:

During the year there was expended for such additions and betterments $2,307,895, which has been charged to the reserves created for such purposes.

The business received during the year amounted to $58,118,042, which, together with unfilled orders on the books of the company January 1, 1923, of $49,349,140, made a total of $107,367,182. Of the business obtained during the year about 86 per cent was received in the first six months.

Unfilled orders on the books of the company December 31, 1923, amounted to $17,789,873, of which 2.7 per cent was foreign business.

The inventory account on December 31, 1923, including materials, supplies, stock locomotives and parts and contract work in process amounted to $12,815,053 in comparison with $15,337,873 for the same items on December 31, 1922. The materials and supplies have been valued at cost or market price whichever was lower.

The company during the year had most gratifying results in developing steam locomotives of the three cylinder type. Although only three of the three cylinder type engines have been completed, recent tests during actual road service, have demonstrated without question, that for a given weight on the driving wheels of a locomotive there can be obtained from engines of the three cylinder type, if properly designed, more power, a steadier pull, better economy in the use of steam and a more economical combustion of the fuel than on engines of the two cylinder type most generally used. The officers of the company are optimistic as to future business in engines of the three cylinder type when their merits are more generally known.

The condensed income account follows:

	1923	1922
Gross earnings	$90,180,176	$29,122,112
Manufacturing, maintenance and administrative expenses	74,311,250	26,288,361
Depreciation	1,581,363	1,447,274
Interest on bond of constituent companies, etc.	85,998	85,998
	$75,978,611	$27,821,633
	$14,201,565	$1,300,479
Deduct for United States and Canadian income taxes	1,825,000	200,000
Available profit	$12,376,565	$1,100,479
Dividends on preferred stock	1,750,000	1,750,000
Dividends on common stock	2,500,000	1,500,000
Surplus after dividends	$8,126,564	Def. $2,149,521
Reserved for additions and betterments	4,500,000	.....
Net credit to surplus account	$3,626,565	.....

Chicago Railway Equipment Company

The annual report of the Chicago Railway Equipment Company for 1923 shows surplus or undivided profits of $1,494,588 as compared with $780,851 in 1922, an increase of $707,737 after the payment of dividends of $209,775 on the seven per cent preferred stock and $179,808 on the common stock. Additions to capital assets to the amount of $161,621 were provided out of the year's earnings. The balance sheet as of December 31, 1923, is as follows:

ASSETS

	1923	1922
Capital Assets—		
Properties at Chicago, Franklin, Marion and Grand Rapids	$324,595	$1,596,791
Buildings, machinery, plant and equipment	2,615,561	.....
Additions during the year	77,778	.....
Deduct depreciation reserve balance December 31, 1922	1,298,435	.....
Amount provided out of earnings for the year	161,621	.....
Less expenditures for replacements, etc.	104,557	.....
Patterns, etc., at depreciated book value	28,481	.....
Goodwill and patents	766,757	793,225
Total capital assets	$2,457,672	$2,390,016
Current Assets—		
Inventories of finished product, work in process, raw materials and supplies	2,056,871	1,580,336
Investments	5,776	5,776
Accounts and bills receivable and cash in banks and on hand	2,009,585	.....
Deferred Charges—		
Insurance premiums unexpired, etc.	3,461	1,850
	$6,533,366	$5,809,670

LIABILITIES

	1923	1922
Capital Liabilities—		
Capital Stock:		
7 Per cent Cumulative Preferred Stock—Authorized—120,000 shares of $25 each	$3,000,000	$4,495,200
Less—		
In Treasury, 128 shares, $3,200. Held for exchange for original issue of common shares of $10 each, 20 shares, $500	3,700	.....
Add—50 shares of original issue of common shares of $10 each not yet exchanged	500	.....
Common Stock—		
Authorized—60,000 shares of $25 each	1,500,000	.....
Less—In treasury, 64 shares	1,600	.....
Total capital liabilities	$4,495,200	$4,495,200
Current Liabilities—		
Accounts payable and miscellaneous accrued liabilities	$239,895	.....
Dividends unpaid at December 31, 1923	661	224,598
Reserves—		
For contingencies	160,000	.....
Inventory reserve	143,020	303,021
Undivided profits	1,494,588	786,851
Dividends paid:		
Preferred stock, 7 per cent	209,775	.....
Common stock, $3 per share	179,808	.....
	$6,533,366	$5,809,670

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is calling for bids for the construction of an express building at Dodge City, Kan.

ATCHISON, TOPEKA & SANTA FE.—This company will construct additional passing and industrial tracks at Corcoran, Cal., at an estimated cost of $25,000.

ATCHISON, TOPEKA & SANTA FE.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Marland, Okla., for a distance of 9.6 miles to reach a part of the Tonkawa oil field.

CANADIAN NATIONAL.—This company has entered into an agreement with the Canada Creosoting Company calling for the erection and operation of a tie and timber treating plant at Truro, Nova Scotia.

CANADIAN PACIFIC.—This company has announced a large program of extension and betterment for the current year. For one section of this program that railway has given an order to the Algoma Steel Company for 50,000 tons of 100-lb. rails, 25,000 tons being for the Western lines and 25,000 tons for the Eastern lines. Additional yard trackage will be constructed between Fort William, Ont., and Port Arthur to provide for the new terminal elevators at the head of the lakes. Considerable extensions will also be made to the terminal tracks at Ignace, Kenora, Outlook and Wynyard. Extensions will also be made to the existing trackage at Vermilion, Murillo, Fort Garry, Austin, Virden, Minnedosa, Johnston, Bredenbury, Antler, Tuxford, Cluny, Kirkpatrick, Kneehill, Milk River, Spring Coulee, New Dayton, Calgary, Coleman, Bank, Temple, Duthil, Nisku, Ottertail, Misko, Salmon Arm, Nutchill, Grind Rod, Okanagan Landing, Beavermouth and Vancouver. Extensions will be made to the engine houses at Outlook and Wynyard, and the mechanical facilities will also be improved at Medicine Hat. At Winnipeg the power house at the main terminal will be completely replaced by one of the most modern design. The station power plant at Calgary will also be remodelled. A Y. M. C. A. building will be erected at Ignace. In Eastern Canada the company will complete the ballasting of the main line between Montreal and Toronto and between Montreal and Ottawa. There will be 44 miles of rock ballast added between Toronto and Fort William and the laying of 150 miles of new 100-pound rails between the two latter points. Station work will include a new station and divisional headquarters at Schreiber, Ont., and grain handling facilities at Port McNicoll, Ont. Passing tracks, industrial tracks and yard extensions will be built at Chesterville, Tay, Lake Shore Junction, Point au Baril, Cache Bay, White River and Heron Bay in Ontario. To handle heavier locomotives a number of steel bridges will be replaced on the Havelock sub-division.

CENTRAL OF GEORGIA.—President L. A. Downs of this company announced in Birmingham on February 24 that the company would spend between $5,000,000 and $6,000,000 on practically rebuilding its line from Birmingham, Ala., to Columbus, Ga. (157 miles), and that a contract for this work would be let about April 1 of the present year. The object of this work is to eliminate curves and grade crossings and to reduce the grade. These improvements will include the elimination of 40 highway and two railway grade crossings, 83 curves and the reduction of the maximum grade for eastbound traffic.

CHICAGO, BURLINGTON & QUINCY.—This company is calling for bids for the construction of a five-stall addition to its roundhouse at Edgemont, S. Dak., and a five-stall addition to its roundhouse at Denver, Colo. This company is also calling for bids for the construction of an addition to its hotel and eating house at Cody, Wyo.

CHICAGO, ROCK ISLAND & PACIFIC.—This company, the Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy, and the City of St. Joseph, Mo., will jointly construct a steel and concrete viaduct over their tracks at South Sixth street in St. Joseph. The viaduct will be 370 ft. long and is estimated to cost approximately $175,000.

ERIE.—This company is installing a Hulett ore unloading machine at Cleveland, Ohio, and will complete the installation within 30 days.

GREAT NORTHERN.—This company plans the construction of a 30-stall roundhouse at Troy, Mont. This company also plans the construction of a brick passenger station and the elevation of its tracks over Third street in Troy.

HUDSON & MANHATTAN.—This company, at a hearing before the Public Utilities Commission at Newark, N. J., on February 19, announced that it will start work soon on a new subterranean passageway between its station under Pavonia avenue, Jersey City, and the Erie passenger station, to cost approximately $700,000.

MISSOURI-KANSAS-TEXAS.—This company has awarded a contract to Bellows MacLay Construction Company, Dallas, Tex., for the construction of a seven-story concrete warehouse at Dallas, reported in the *Railway Age* of January 26.

MISSOURI-KANSAS-TEXAS.—This company is reported to be planning the construction of a one-story car repair shop at Denison, Tex., at a cost of $175,000.

MISSOURI PACIFIC.—This company is calling for bids for the construction of an addition to its storehouse at Ewing avenue, St. Louis, Mo.

NEVADA-CALIFORNIA-OREGON.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of an extension from Lakeview, Ore., north for a distance of 6 miles.

PENNSYLVANIA.—This company will soon begin the construction of an office building and freight house at Cincinnati, Ohio, reported in the *Railway Age* of February 9. Plans for the structure have been completed.

PUEBLO CONSERVANCY DISTRICT.—This organization, through the Dayton-Morgan Engineering Company, Dayton, Ohio, has awarded contracts for the construction of flood control works at Pueblo, Colo., reported in the *Railway Age* of November 10. A contract has been awarded to Platt Rogers, Inc., Pueblo, for the construction of 33 miles of railroad track, for channel excavation aggregating approximately 1,000,000 cu. yd. of earth, and for the construction of a concrete barrier dam in Rock Canyon. A contract has been awarded to Cole Brothers, Green Bay, Wis., for additional channel excavation, involving the removal of 54,000 cu. yd. of earth, and for the construction of a railroad embankment and several levees. A contract has been awarded to A. S. Hall & Son, Colorado Springs, Colo., for the construction of the sub-structures of two railroad bridges and for the construction of a reinforced concrete bridge. A contract has been awarded to the Virginia Bridge & Iron Company, Roanoke, Va., for the fabrication and delivery of four 100-ft. double track, through riveted truss spans. A contract has been awarded to the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, for the fabrication and delivery of two 200-ft. double track steel bridge spans. Contracts have been awarded to the Strobel Steel Construction Co., Chicago, and the Pueblo Bridge & Construction Co., Pueblo, for the erection of the two bridges. A contract has been awarded to William Olson, Pueblo, for the construction of the embankment of Rock Canyon barrier dam, involving 90,000 cu. yd. of earth fill.

SOUTHERN.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension of 2.93 miles in the city of Knoxville, Tenn.

SOUTHERN PACIFIC.—This company will construct a passenger station at Jeanerette, La., with company forces.

SPOKANE, PORTLAND & SEATTLE.—This company plans the construction of a brick and concrete passenger station at Astoria, Ore., at a cost of $70,000.

ST. LOUIS-SAN FRANCISCO.—This company is calling for bids for the construction of a brick passenger station at Bristow, Okla.

UNION PACIFIC.—This company has completed plans for the construction of an 18-mile extension from Fort Collins, Colo., reported in the *Railway Age* of January 5.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Abandonment Authorized.*—The Interstate Commerce Commission has authorized this company and the California, Arizona & Santa Fe to abandon the Barnwell branch of the latter company from Goffs, Cal., to Searchlight, Nev., 53.25 miles.

CENTRAL OF GEORGIA.—*Bond Issue.*—Kuhn, Loeb & Co. have purchased, subject to the approval of the Interstate Commerce Commission, $5,000,000 Central of Georgia refunding and general mortgage 5½ per cent bonds, series "B," due April 1, 1959, which they have sold, privately at 97 and accrued interest, to yield 5.70 per cent.

CHICAGO, BURLINGTON & QUINCY.—*Bonds Sold.*—J. P. Morgan & Co., the First National Bank and the National City Company have sold $10,000,000 first and refunding mortgage 5 per cent bonds, due February 1, 1971, at 98 and interest, to yield about 5.11 per cent.

Hill Resigns as Director.—Louis W. Hill, chairman of the board of the Great Northern, has resigned as a director and member of the executive committee of the Chicago, Burlington & Quincy and has been succeeded in both positions on the Burlington by Charles O. Jenks, vice-president in charge of operation of the Great Northern.

CHICAGO, ROCK ISLAND & PACIFIC.—*Bond Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,000,000 of 4 per cent general mortgage gold bonds and $1,000,000 of 4 per cent first and refunding mortgage gold bonds, to be issued against the general mortgage bonds. The general mortgage bonds are to reimburse the treasury for expenditures and to be used as a basis for the refunding bonds, which are to be held in the treasury for the present.

DELAWARE, LACKAWANNA & WESTERN.—*Board Changes.*—Jackson E. Reynolds, president of the First National Bank of New York, has resigned as a director and Frank Rysavy, formerly a director of the Lackawanna, has been elected to succeed him. Mr. Reynolds had been a director since January last, when he took the place of Mr. Rysavy. His resignation now is due to the fact that he recently became a member of the board of directors of the New York Central.

Approves Sussex Lease.—The stockholders have approved the recommendations of the board of managers that the company take over a lease on the Sussex Railroad. The lease was approved recently by the Interstate Commerce Commission.

DETROIT CONNECTING.—*Denial of Certificate Recommended.*—The Interstate Commerce Commission has made public a proposed report by C. E. Boles, attorney-examiner, and E. Gray, engineer-examiner, recommending a denial of this company's application for a certificate authorizing the construction of a line from Delray to Marine City, Mich., 86.7 miles.

DETROIT GRAND BELT.—*Denial of Certificate Recommended.*—The Interstate Commerce Commission has made public a proposed report by Attorney-Examiner Boles and Engineer-Examiner Gray, recommending the denial of this company's application for a certificate for the construction of a line from Wyandotte to Mt. Clemens, Mich.

DETROIT, TOLEDO & IRONTON.—*Bond Issue.*—The Interstate Commerce Commission has authorized an issue of $242,000 of first mortgage 50-year 5 per cent bonds to be sold at not less than par.

HOCKING VALLEY.—*Notes Sold.*—J. P. Morgan & Co., Kuhn, Loeb & Co., First National Bank, Guaranty Company and National City Company have placed privately $6,000,000 two-year 5 per cent notes at 99¼ and interest, to yield 5.40 per cent. The Interstate Commerce Commission has authorized the Hocking Valley to pledge as collateral for the notes $7,500,000 of general mortgage bonds.

To Redeem Bonds.—J. P. Morgan & Co. have notified holders of the $7,500,000 of five-year 6 per cent bonds, maturing on March 1, that principal and interest would be paid at their office.

ILLINOIS CENTRAL.—*Bond Issue.*—The Interstate Commerce Commission has authorized this company and the Chicago, St. Louis & New Orleans to issue $6,486,000 of first refunding mortgage 5 per cent bonds to be delivered to the Chicago, St. Louis & New Orleans and by it to the Illinois Central in reimbursement of advances. The Illinois Central was also authorized to sell the bonds and $5,118,000 of similar bonds at 91.25, the proceeds to be used to pay off certain short term notes.

INTERNATIONAL-GREAT NORTHERN.—*To Pay Four Per Cent.*—The directors have voted to pay 4 per cent on the adjustment mortgage bonds for 1923.

To Oppose Sale.—See item below on New Orleans, Texas & Mexico.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Extends Stock Deposit Limit.*—This company has extended the time for deposit of Wisconsin Central stock for thirty days until April 1. The deposit of the stock is a part of the plan for the Soo Line to acquire the minority stock of the Wisconsin Central.

NEW ORLEANS, TEXAS & MEXICO.—*Asks Authority to Acquire I.-G. N.*—This company has applied to the Interstate Commerce Commission for authority to acquire the International-Great Northern by purchase of its entire stock at $31 a share from the voting trustees.

The Chamber of Commerce of San Antonio, Texas, and the Railroad Commission of Texas will oppose before the Interstate Commerce Commission the sale of the International-Great Northern to the Gulf Coast Lines. The voting trust certificate holders of the International-Great Northern will meet on March 1 to pass on the sale.

NEW YORK, CHICAGO & ST. LOUIS.—*Equipment Trusts Sold.*—Guaranty Company of New York and Lee, Higginson & Co. have sold $2,865,000 equipment trusts of 1924 5 per cent gold certificates at prices to yield 4.80 to 5.05 per cent, according to maturity.

NORFOLK & WESTERN.—*Lease by Pennsylvania Expected.*—See Pennsylvania item below.

PENNSYLVANIA.—*Lease of N. & W. Expected.*—In response to several inquiries as to whether the Pennsylvania expected to lease the Norfolk & Western, Samuel Rea, president of the Pennsylvania, stated that there had been no change in the situation from that expressed in his testimony before the Interstate Commerce Commission on May 17, 1923, in which he pointed out that the interests of both companies were so intertwined, and their mutual prosperity so intimately united, that a lease would be to the interest of not only both companies, but also to the territory served by them, provided satisfactory terms could be reached. So far no steps have been taken to incept negotiations. The matter in addition to requiring the approval of the stockholders must also be approved by the Interstate Commerce Commission, and he felt that it would be welcomed by the public as furthering the railroad consolidation policy under the federal Transportation Act.

Mr. Rea further stated that prior to and since the time he testified before the Commission, the owners of large coal properties in Pennsylvania had increased their holdings of coal properties along the Norfolk & Western, and that the Pennsylvania Railroad System was the distributing territory for a very large part of that coal output, as well as for the interchange of other traffic. This mutual development of traffic was, therefore, very much in the interest of the states served by the Norfolk & Western. In addition both companies were shipping through the port of Norfolk a large traffic which a lease would materially increase, and both of the companies had very important terminal developments to make in and near the city of Norfolk so that from whatever standpoint the situation was viewed, it seemed to be in the interest of the public that this closer relationship by a lease should be brought about.

Mr. Rea also said that for over 20 years the Pennsylvania had been largely instrumental in bringing the Norfolk & Western to its present sound position, and in that work it had preserved the independent operating management of the Norfolk & Western. So far as he could foresee the future, that would be a most desirable policy to continue under a lease, because it called for the most efficient operation, and had resulted in greatly increased traffic and good net earnings for the Norfolk & Western, and had greatly increased the traffic interchanged.

PHILADELPHIA, BALTIMORE & WASHINGTON.—*Bond Issue.*—This company has been authorized by the Interstate Commerce Commission to issue $10,000,000 of general mortgage 5 per cent bonds to be delivered to the Pennsylvania in settlement of expenditures for additions and betterments. The Pennsylvania was also authorized to guarantee the bonds and sell them at not less than 96.

The Maryland Public Service Commission withdrew its

suit to restrain the Philadelphia, Baltimore & Washington from issuing the bonds after the railroad had applied to that commission for its approval of the issue.

PHOENIX & EASTERN.—*Termination of Lease.*—See Arizona Eastern.

PITTSBURGH, YOUNGSTOWN & ASHTABULA.—*Bond Issue.*—This company has been authorized by the Interstate Commerce Commission to issue $690,000 of first general mortgage 5 per cent bonds to be delivered to the Pennsylvania in partial settlement for expenditures. The Pennsylvania was also authorized to guarantee the bonds as lessee and to sell them, together with $3,789,000 of similar bonds, at not less than 96 for the purpose of reimbursing its treasury.

RUMFORD FALLS & RANGELEY LAKES.—*Bond Issue.*—The Interstate Commerce Commission has authorized an issue of $300,000 of 6 per cent sinking fund mortgage gold bonds to be sold at not less than 93.86, the proceeds to be used to refund maturing securities. Authority was also granted to the Portland & Rumford Falls and the Maine Central to guarantee the bonds.

SUBSIDIARY FINANCING.—See Philadelphia, Baltimore & Washington.

TENNESSEE CENTRAL.—*Sued by Terminals.*—A suit for $105,083 has been filed against this railway by the Nashville Terminals Company, the claim resulting from a difference between the corporations as to the amount of rental the complainant is entitled to for the use of its terminals. The old Tennessee Central Railroad had a contract with the terminal company, entered into in 1902, providing for the payment of $50,000 annual rental for the use of the terminal tracks and bridge in Nashville. This was changed in 1911, the rent being advanced to $110,000 per year, according to the terminal company's contention. The present railway company, which bought the road and the terminal leases in 1922 in Federal court, does not recognize the validity of the 1911 lease contract, and has been paying $50,000 per year under the contract of 1902. The terminal company's petition asks that the court affirm the validity of the 1911 contract and require the railway to pay for the use of the terminals since February 1, 1922, at the rate of $110,000 per annum, less the sums that have been paid under the 1902 contract.

VALLEY.—*Bond Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue $2,000,000 of first and refunding mortgage bonds to be guaranteed by the Delaware, Lackawanna & Western, part to be used for refunding purposes and part to be held in the treasury.

WISCONSIN CENTRAL.—*Notice to Stockholders.*—William J. Wollman, chairman of the minority stockholders committee, has issued a notice calling on minority stockholders to deposit their bonds under the agreement with the Minneapolis, St. Paul & Sault Ste. Marie, whereby that road was to purchase the stock of the Wisconsin Central for $43.25 a share. The notice added:

> A very considerable number of shares have already been deposited, but in our judgment the deposit of a substantial majority of the outstanding stock is necessary to insure the consummation of the deal. It is therefore of the utmost importance that every holder deposit his stock promptly.
>
> The depositaries are the Bankers Trust Company of New York and the Minneapolis Trust Company of Minneapolis. The certificates of deposit issued by the former are listed on the New York Stock Exchange.

Dividends Declared

New York, Lackawanna & Western.—$1.25, quarterly, payable April 1 to holders of record March 14.

Philadelphia & Trenton.—2½ per cent, quarterly, payable April 10.

Pittsburgh, Fort Wayne & Chicago.—Common, $1.75, quarterly, payable April 1 to holders of record March 10; preferred, $1.75, quarterly, payable April 8 to holders of record March 10.

Rochester & Syracuse.—$1.00, quarterly, payable March 15 to holders of record March 1.

St. Louis Southwestern.—Preferred, 1¼ per cent, payable March 31 to holders of record March 15.

Trend of Railway Stock and Bond Prices

	Feb. 26	Last Week	Last Year
Average price of 20 representative railway stocks	61.84	61.61	68.81
Average price of 20 representative railway bonds	83.58	83.37	84.29

Railway Officers

Financial, Legal and Accounting

Charles L. Howard, secretary of the Western Railroad Association with headquarters at Chicago, has been appointed also assistant to the general counsel.

Operating

F. T. Mahoney, general yardmaster of the Missouri Pacific, with headquarters at Fort Smith, Ark., has been promoted to terminal trainmaster, with the same headquarters, succeeding **J. B. Lankford,** transferred to McGehee, Ark.

W. D. Beck, heretofore superintendent of car service of the Chicago & North Western, having been appointed chairman of the Chicago Operating Committee, Car Service Division, American Railway Association, has also been appointed district manager and manager refrigerator department of the Car Service Division, in place of J. M. Egan, resigned to become vice-president of the Missouri Pacific.

A. J. Hancock, whose promotion to assistant to the general manager of the Southern Pacific, with headquarters at San Francisco, Calif., was reported in the *Railway Age* of February 2, was born on March 4, 1880, at Frankfort, Ky. He entered railway service in August, 1899, as a clerk and express messenger of the Adams Express Company and he later was employed as a clerk and telegrapher by the Western Union and the Postal telegraph companies, the Louisville & Nashville, the Louisville, Henderson & St. Louis, the Union Pacific, and the Kansas City Southern. Mr. Hancock entered the service of the Southern Pacific in July, 1903, as a stenographer in the office of the superintendent of telegraph. The following year he left railway service for a short time, returning to the Southern Pacific in August, 1904, as telegrapher and chief clerk to the division superintendent. In February, 1906, he was appointed dispatcher and chief clerk to the general manager of the Kansas City, Mexico & Orient and he held this position until September, 1912, when he returned to the Southern Pacific as assistant chief clerk to the general manager. He was promoted to chief clerk to the vice-president and general manager in March 1913. In January, 1917, when the efficiency bureau was abolished, Mr. Hancock returned to his former position of assistant chief clerk to the general manager and in September, 1918, he was again promoted to chief clerk to the general manager. Mr. Hancock was promoted to supervisor of transportation in October, 1921, and he continued in this position until his recent promotion to assistant to the general manager.

A. J. Hancock

Traffic

G. A. Fischer has been appointed general agent of the Chicago, Indianapolis & Louisville, with headquarters at New Orleans, La., a newly created position.

Edward Briggs, whose promotion to general traffic manager of the Wheeling & Lake Erie was reported in the *Railway Age*

of February 16, was born on August 17, 1862, at New York. He entered railway service in October, 1882, as a bill clerk in the freight office of the Connotton Valley and was later promoted to local ticket agent and local freight agent. He was appointed chief clerk to the general manager of the Cleveland, Canton & Southern in 1889, and in 1890, he was appointed chief clerk to the general freight agent. Mr. Briggs left railway service in July, 1899, when he was appointed chief clerk to the traffic manager of the Republic Iron & Steel Company. In January, 1900, he was appointed chief clerk to the general traffic manager of the Wheeling & Lake Erie and in July, 1907, he was appointed commercial freight agent for the Wabash. Mr. Briggs returned to the Wheeling & Lake Erie in July, 1908, as general agent at Cleveland, Ohio, and in 1914, he was promoted to assistant general freight agent. He was promoted to general freight agent in 1916, and he held this position until 1918, when, at the beginning of the period of federal control, he was appointed chief clerk to the federal manager. Mr. Briggs was appointed general freight agent in March, 1920, and he continued in that position until his recent promotion to assistant to the general traffic manager.

Charles E. Rolfe, whose appointment as assistant general traffic manager of the Delaware & Hudson, with headquarters at Albany, N. Y., was announced in the *Railway Age* of January 26, page 310, was born in Nashua, N. H., and was educated in the public schools and at Gorham Academy, Gorham, Me. He entered railway service on January 21, 1877, as a station agent of the Portland & Rochester, now a part of the Boston & Maine, and in 1884 he was appointed traveling freight agent of the Fitchburg, now also a part of the Boston & Maine, which position he held until 1892, when he was promoted to division freight agent of the same road. In 1896 Mr. Rolfe was appointed general eastern freight agent of the Delaware & Hudson and in 1903 he was appointed assistant general freight agent. In 1905 he was promoted to general freight agent and subsequently served as general eastern freight agent and assistant general freight agent, with headquarters at Albany, which position he was holding at the time of his promotion.

C. E. Rolfe

William W. Finley, Jr., whose appointment as general southeastern freight agent of the Pennsylvania, with headquarters at Atlanta, Ga., was announced in the *Railway Age* of January 26, page 310, was born on August 11, 1888, at Dallas, Tex., and was educated at various private schools. He was graduated from the University of Pennsylvania in 1910, and entered railway service on November 14, of the same year, with the Pennsylvania as a freight clerk at Washington, D. C., and later served in the same capacity at Philadelphia, Pa. On March 1, 1912, he was appointed a clerk at Harrisburg, Pa., and on August 1, he was promoted to freight solicitor at Baltimore, Md. He later served in this capacity at Newark, N. J., and Rochester, N. Y. On March 1, 1916, Mr. Finley was appointed district freight solicitor at Atlanta, Ga., and in January, 1918, he was appointed district representative at Philadelphia. On April 25, 1918, he entered the service of the United States Government and on November 14, of the same year, he returned to the Pennsylvania as a district representative at Philadelphia. In March, 1920, he was appointed chief clerk to the traffic manager at Pittsburgh, Pa., and on January 1, 1922, Mr. Finley was promoted to division freight and passenger agent at Chambersburg, Pa., which position he held at the time of his recent promotion to general freight agent.

Engineering, Maintenance of Way and Signaling

W. A. Greenleaf, roadmaster on the Tampa & Gulf Coast, has been promoted to division engineer, a newly created position, with headquarters at Tampa, Fla.

C. H. Mottier, office engineer of the Illinois Central Chicago Terminal Improvements, with headquarters at Chicago, has been promoted to engineer of design, with the same headquarters, a newly created position.

W. J. Bergen, whose promotion to chief engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was reported in the *Railway Age* of February 9, was born on February 16, 1872, at Waterbury, Conn. He graduated from Rensselaer Polytechnic Institute, Troy, N. Y., in June, 1897, and entered railway service in May, 1899, as assistant to the division engineer on construction with the Burlington & Missouri River, now a part of the Chicago, Burlington & Quincy, in Nebraska. In July, 1899, he was appointed levelman on location and in January, 1900, he was promoted to division engineer on construction. Mr. Bergen was appointed assistant engineer of the New York, Chicago & St. Louis, in July, 1901, and he held this position until January, 1907, when he was promoted to chief supervisor of track. He was promoted to first assistant to the chief engineer in August, 1907, and to engineer in charge of grade elimination in December, 1916. In October, 1918, Mr. Bergen was appointed chief engineer and he remained in this position throughout the period of federal control. In March, 1920, he was appointed consulting and valuation engineer and he continued in this capacity until his recent promotion to chief engineer.

W. J. Bergen

Mechanical

H. M. Warden, whose promotion to superintendent of the locomotive department of the Missouri-Kansas-Texas, with headquarters at Parsons, Kans., was reported in the *Railway Age* of February 9, was born on January 12, 1887, at San Antonio, Texas. He entered railway service as a machinist apprentice on the San Antonio & Aransas Pass and in August, 1914, was appointed machinist on the Missouri-Kansas-Texas. He was promoted to roundhouse foreman in December, 1914, and in May, 1915, he was promoted to general foreman at Wichita Falls, Tex. Mr. Warden was transferred to Smithville, Tex., in August, 1916, and was promoted to superintendent of the reclamation plant at Parsons, Kans., in October, 1918. He held this position until December, 1923, when he was promoted to shop superintendent at Waco, Tex. Mr. Warden held this position until his promotion to superintendent of the locomotive department, with headquarters at Parsons, Kans.

H. M. Warden

W. E. Dunham, whose promotion to superintendent of the car department of the Chicago & North Western, with headquarters at Chicago, was reported in the *Railway Age* of February 16, was born at Newark, N. J. He graduated from Cornell University in 1895 and entered railway service in 1896 in the shops of the Chicago, Rock Island & Pacific, at Horton, Kans. He was promoted to draftsman at Chicago in 1898, and in 1901, he was promoted to master mechanic at Dalhart, Tex. Mr. Dunham entered the service of the Chicago & North Western in 1902 as chief draftsman in the mechanical department at Chicago and in 1903, he was promoted to mechanical engineer. He was promoted to master mechanic at Winona, Minn., in 1906, and he held this position until 1910 when he was promoted to supervisor in the motive power and car department. He was promoted to assistant to the general superintendent of the motive power and car department in 1917, and in 1921, his title was changed to assistant to the general superintendent of motive power and machinery. Mr. Dunham continued in this position until his recent promotion to superintendent of the car department.

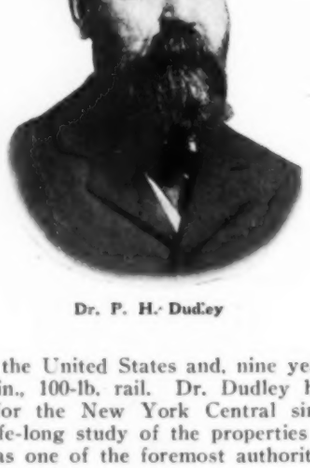
Purchasing and Stores

J. L. Harbry has been appointed division storekeeper of the Pere Marquette, with headquarters at Grand Rapids, Mich., succeeding H. J. Van Ness, resigned.

Obituary

J. E. Utt, formerly general agent for the Chicago, Rock Island and Pacific at Omaha, Neb., who retired ten years ago, died at San Diego, Cal., on February 21.

Dr. Plimmon H. Dudley, consulting engineer on rails, tires and structural steel of the New York Central, with headquarters in New York City, died in New York on February 25. Dr. Dudley was born at Freedom, Ohio, on May 21, 1843, and attended Franklin Institute. Later he received the degree of doctor of philosophy from Hiram (Ohio) College. His first railway service was with the Valley Railroad, a small line in Ohio, of which he was chief engineer from 1872 to 1874. From 1876 to 1878 he did special work for the Eastern Railroad Association. Dr. Dudley made a dynamometer car in 1874 and a track indicator in 1880. In 1883 he designed the first 5-in., 80-lb. steel rail used in the United States and, nine years later, designed the first 6-in., 100-lb. rail. Dr. Dudley had been consulting engineer for the New York Central since 1880 and, having made a life-long study of the properties of steel, has been recognized as one of the foremost authorities on the subject in the country.

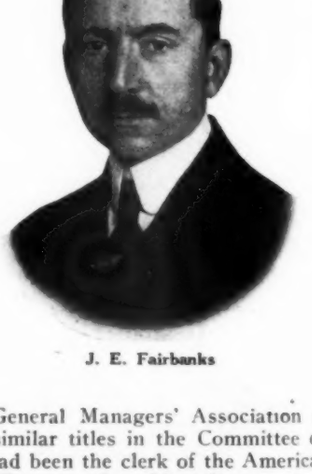


Dr. P. H. Dudley

J. V. Anderson, superintendent of the Nebraska division of the Union Pacific, with headquarters at Omaha, Nebr., died at Grand Island, Nebr., on February 21. Mr. Anderson was 54 years of age. He had been in the service of the Union Pacific since 1890, when he started as a telegraph operator.

T. A. Polleys, tax commissioner of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Chicago, died in Evanston, Ill., on February 23. Mr. Polleys was born on January 31, 1865, at Trempealeau, Wis., and graduated from the University of Wisconsin in 1888. He entered railway service in January, 1896, as an attorney in the law department of the Chicago, St. Paul, Minneapolis & Omaha. In June, 1901, he was appointed assistant general attorney for the Chicago Great Western, with headquarters at St. Paul, Minn., and he held this position until July, 1903, when he returned to the Chicago, St. Paul, Minneapolis & Omaha as tax commissioner. Mr. Polleys was promoted to secretary, right-of-way agent and tax commissioner in October, 1907, and he held this position until December, 1915, when he was promoted to tax commissioner of both the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha. He continued in this capacity until his death. Mr. Polleys was an expert on tax matters and originated a statistical system now widely used for the determination of railway valuation.

John E. Fairbanks, general secretary and treasurer of the American Railway Association for the last eight years, and prominent in the activities of the association since 1909, died at his home in Jersey City, N. J., on February 24, after a short illness from pneumonia. Mr. Fairbanks was born in Jersey City on December 5, 1870, and was educated in that city. He entered the service of the American Railway Association on April 21, 1892, and on June 1, 1909, was appointed assistant general secretary and assistant treasurer; and was appointed general secretary and treasurer on November 17, 1915. While holding both of these offices, he held similar positions in the Bureau of Explosives, and was secretary of the General Managers' Association of New York. He also held similar titles in the Committee on Railway Mail Pay, and he had been the clerk of the American Railway Guild for the past 25 years. On taking the secretaryship, in 1915, Mr. Fairbanks succeeded William F. Allen, the well-known first secretary of the association, to whom Fairbanks had been an able assistant for over 20 years. In 1915, the association did its work through 16 committees, the secretary being the guiding spirit in most of the work of the committees; but four years later, and following changes incident to government operation of the railroads, the scope of the American Railway Association was greatly enlarged, and the general secretary's activities now require offices in three cities, New York, Chicago and Washington. The expansion of the association beginning in 1919 has amalgamated with it no less than 12 associations of railroad officers formerly independent, namely: American Association of Freight Agents; American Association of Railway Surgeons; American Railway Master Mechanics' Association; Association of Railway Telegraph Superintendents; American Railway Perishable Freight Association; Association of Transportation and Car Accounting Officers; Freight Claim Association; International Association of Railway Special Agents and Police; Master Car and Locomotive Painters' Association; Master Car Builders' Association; Railway Signal Association; Railway Storekeepers' Association. The parent association at the present time consists of eight divisions, each with its own secretary, and nine sections; with approximately two hundred standing committees. The office of the Secretary of the American Railway Association has always been the chief point of contact, for American railroad officers, with the International Railway Congress Association, and Mr. Fairbanks served as a delegate of the American Railway Association at the International Congress in Rome, Italy, in 1922.



J. E. Fairbanks

THE NUMBER of stockholders of the Pennsylvania Railroad Company on February 1 totaled 144,731, an increase of 503 over January, and 6,186 over February 1, 1923.